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H. O. No. 155

# BLACK SEA PILOT

## THE DARDANELLES, SEA OF MARMARA, BOSPORUS, BLACK SEA, AND SEA OF AZOV

SECOND EDITION
1926

PUBLISHED AND SOLD BY THE HYDROGRAPHIC OFFICE
UNDER THE AUTHORITY OF THE
SECRETARY OF THE NAVY

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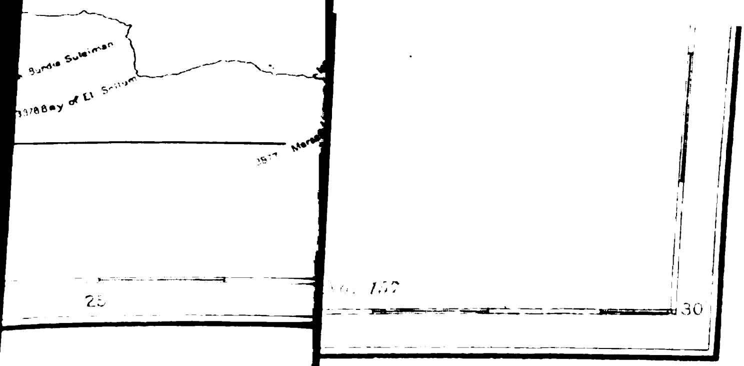

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# PREFACE

This publication is a revision of the first edition of H. O. No. 155, Black Sea Pilot, and is corrected to September 18, 1926 (including Notice to Mariners No. 38).

The principal sources of information examined in preparation of this edition are:

Black Sea Pilot, Admiralty, London, 1920, with supplement to August 17, 1925.

Turkey, Commercial and Industrial Handbook, United States Department of Commerce, 1926.

Rumania, An Economic Handbook, United States Department of Commerce, 1924.

Reports from United States naval vessels.

Reports from officers of the merchant marine.

Information furnished by United States consuls.

Charts, light lists, standard books of reference, and various documents in the possession of the department.

In this publication the bearings and courses are true in degrees from 0° (north) to 360°, measured clockwise.

Bearings limiting sectors of a light are toward the light.

The directions of winds refer to the points from which they blow; of currents, the points toward which they set. These directions are true.

Variation of the compass, with the annual rate of change, may be obtained by consulting H. O. Chart No. 2406.

The geographical positions which are given at intervals throughout the book are approximate only, and are intended to facilitate reference to the charts.

Distances are expressed in nautical miles, the mile being approximately 2,000 yards.

Distances less than a mile are expressed in fractions of a mile or in yards.

Soundings are referred to the datum of the charts (see pages 8 and 43), and are expressed in fathoms or feet followed by the equivalent in meters.

The metric conversions are given in every case to the nearest tenth meter.

For details of lights, light vessels, fog signals, submarine bells, and light buoys mariners should consult the Light Lists, as such lists are published annually, while Sailing Directions can ordinarily only be revised at much greater intervals.

Masters of vessels should keep complete files of weekly Notices to Mariners and supply themselves with the latest Lists of Lights, and seek from local authorities, pilots, and harbor masters the latest information relative to any special regulations in force in the particular locality visited.

Supplements to each volume of Sailing Directions are issued annually in a form convenient for cutting and inserting in the books the pages affected. They include all important information from reliable sources received in the Hydrographic Office since the publication of the latest editions of the Sailing Directions. The information contained in each supplement should be embodied in the volume affected and will bring it up to date.

Mariners are requested to notify the United States Hydrographic Office, Washington, D. C., or one of its branch offices, of errors they may discover in this publication or of additional matter which they think should be inserted.

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CHAPTER I

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# GLOSSARY OF RUSSIAN WORDS THAT MAY BE OF USE TO THE NAVIGATOR

| Russian | English | Russian | English |
|---|---|---|---|
| Admiralteistvo | Government dockyard. | Kuterma | A snowstorm. |
| Bakan | A buoy. | Led | Ice. |
| Baklan | A cormorant. | Lodka | A boat. |
| Banka | A shoal. | Lotzman | A pilot. |
| Bashnya | A tower, a seamark. | Lotzmanski bot | A pilot boat. |
| Bereg | The coast. | Lot | A sounding lead. |
| Blizhni | Near. | Luda | A rock or reef out of water |
| Blokshiv | A hulk. |  |  |
| Bochka | A buoy, a cask. | Luna | The moon. |
| Bolshoi | Great. | Lyes | A forest. |
| Bot | A boat. | Lyesnoi | Wooded. |
| Brosit yakor | To anchor. | Lyeto | Summer, year. |
| Bukhta | A bay, a creek. | Lyevi | Left, port. |
| Buksir | A tug. | Lyevo rulya | Port the helm. |
| Burun | A breaker (surf). | Lyevo na bort | Hard-a-port. |
| Burya | A storm. | Mali | Little. |
| Byeli | White. | Marevo or Mirazh | Mirage. |
| Chaika | A gull. | Matros | A sailor. |
| Chelovyek | A man. | Mayak | A lighthouse. |
| Cherni | Black. | Medvyed | A bear. |
| Dalni | Distant. | Mel | A shoal. |
| Den | A day. | Melkoe myesto | A shallow place |
| Derevo | A tree. | Melkovodie | Shallow water. |
| Derevnya | Village. | Mis | A point, a cape. |
| Dlinni | Long. | Mokri | Wet. |
| Dno | Bottom. | More | The sea. |
| Dolgota | Longitude. | Moroz | Frost. |
| Dom | A house. | Morskaya voda | Sea water. |
| Doroga | A road. | Moryak | A seaman. |
| Dozhd | Rain. | Mrak | Darkness, gloom. |
| Farvater | A channel. | Mutitsya | To become muddy. |
| Flagshtok | Flagstaff. | Myagki | Soft. |
| Fut | Foot. | Myed | Copper. |
| Gavan | A harbor. | Na bereg or Na mel | Ashore. |
| Glubina | Depth, soundings. | Naberezhnaya | A quay. |
| Gluboki | Deep. | Nizhni | Lower. |
| Golik | A broom (on spar buoy). | Nizki | Low. |
| Golova | The head (of a pier). | Nizkaya voda | Low water. |
| Gora | A hill, a mountain. | Noch | Night. |
| Gorizont | The horizon. | Nos | A cape, a headland; bow of a vessel. |
| Gorod | A town, a city. |  |  |
| Gruda | A cairn, a pile. | Novi | New. |
| Gryaz | Mud. | Ogon | Fire, a light. |
| Guba | A bay. | Osen | Autumn. |
| Il | Slime, mud. | Ostrov | An island. |
| Izba | A hut. | Otdat yakor | To let go the anchor. |
| Kabeltov | A hawser, a cable's length. | Otliv | Ebb tide. |
|  |  | Otvalivai | Shove off. |
| Kamen | A rock, a stone. | Ozero | A lake. |
| Kanal | A channel, a canal. | Peleng | A bearing. |
| Kanat | A chain cable. | Peremyenni ogon | An alternating light. |
| Karantin | Quarantine. | Peresheek | An isthmus. |
| Karta | A chart. | Peschani | Sandy. |
| Kater | A boat. | Pesok | Sand. |
| Kayuta | A cabin. | Plavni | A mud flat overgrown with reeds. |
| Kholm | A hill. |  |  |
| Kholodni | Cold. | Plavuchi mayak | A light vessel. |
| Khoroshi | Good. | Pochtamt | A post office. |
| Khudoi | Bad. | Podnyat yakor | To weigh anchor. |
| Kladbische | A cemetery. | Podvodni | Submerged. |
| Kladovaya | A storehouse. | Polden | Noon. |
| Kolyeno | A reach (of a channel, etc.). | Polnaya voda | High water. |
|  |  | Polnoch | Midnight. |
| Kompas | A compass. | Polovina | Half. |
| Korabl | A ship. | Polovoda | High-water spring tides. |
| Kosa | A spit. | Poluostrov | A peninsula. |
| Krasni | Red. | Polyana | An ice field. |
| Krest | A cross. | Port | A port, a harbor. |
| Krugli | Round. | Postoyanni ogon | A fixed light. |
| Krutoyar | Steep banks. | Postoyanni s probleskami ogon. | A fixed and flashing light. |
| Kryepki | Hard. |  |  |
| Kurgan | A tumulus. | Povorot | Turning, tacking, a bend |

| Russian | English | Russian | English |
|---|---|---|---|
| Pozadi | Astern. | Tina | Ooze. |
| Pravi | Right, starboard. | Tishina | A calm. |
| Pravo rulya | Starboard the helm. | Tolstoi | Thick. |
| Pravo na bort | Hard-a-starboard. | Tombui | A buoy. |
| Pribilaya voda | High water. | Tonki | Thin. |
| Priboi | Rollers. | Tuman | A fog. |
| Pribrezhenie | The beach. | Tserkov | A church. |
| Priliv | The flood tide. | Ubilaya voda | Low water. |
| Pristan | A landing stage, a pier. | Uglublenie | Draft of water. |
| Pristavaite | Come alongside. | Ugol | Coal. |
| Problesk | A flash. | Utes | A cliff. |
| Probleskovi ogon | A flashing light. | Utro | Morning. |
| Prokhod | A gullet, a passage. | Uzel | A knot (a nautical mile). |
| Proliv | A strait. | Vecher | Evening. |
| Pryesnaya voda | Fresh water. | Vertyashchisya ogon | A revolving light. |
| Pyatno | A shoal, a patch. | Vesna | Spring. |
| Reid | A roadstead. | Vkhod | Entrance. |
| Rif | A reef. | Vnutrenni | Inner. |
| Riba | A fish. | Vnyeshni | Outer. |
| Rul | A rudder, the helm. | Voda | Water. |
| Rulevoi | A helmsman. | Vodopoemni | Under water, submerged. |
| Rumb | A compass point. | Vodopol | Overflow of a river. |
| Ryeka | A river. | Vodoros | Seaweed. |
| Sazhen | A fathom. | Volnya | A wave. |
| Seld | A herring. | Vorota | Gates, a channel. |
| Selo | A village with a church. | Vostochni | Eastern. |
| Shirota | Latitude. | Vostok | East. |
| Shkval | A squall. | Vpered | Ahead. |
| Shlyupka | A boat. | Vyekha | A perch, a spar buoy. |
| Sini | Blue. | Vyeter | The wind. |
| Skala | A rock, a cliff. | Yakor | An anchor. |
| Sklonenie | Magnetic variation. | Yakornoe myesto | An anchorage. |
| Snyeg | Snow. | Yug | South. |
| Soleni | Salt. | Yuzhni | Southern. |
| Solntse | The sun. | Zakol | A weir. |
| Sredi | In the middle. | Zalif | A bay, a gulf. |
| Stan or Stanovishche | A station, a camp, a settlement. | Zapad | West. |
|  |  | Zapadni | Western. |
| Stari | Old. | Zàvod | A bay, a creek. |
| Storona | Side (of a channel, etc.). | Zavòd | A factory. |
| Stvor | A leading line. | Zavorot | A turning. |
| Stvornie znaki | Leading marks. | Zeleni | Green. |
| Sukhoi dok | A dry dock. | Zemlya | Land. |
| Syeri | Gray. | Zhelti | Yellow. |
| Syever | North. | Zhelyezhaya doroga | Railway. |
| Syeverni | Northern. | Zhelyezo | Iron. |
| Tamozhnya | Customhouse. | Zima | Winter. |
| Techenie | Current. | Znak | A beacon. |
| Temni | Dark (color). | Zoloto | Gold. |
| Tepli | Warm. | Zvyezda | A star. |

# GLOSSARY OF TURKISH WORDS THAT MAY BE OF USE TO THE NAVIGATOR

| Turkish | English |
|---|---|
| Agatch, Aghach, Aghaj | Tree. |
| Aghz | Entrance. |
| Ak | White. |
| Ata, Ada, Adassi | Island, islet, islands. |
| Bahrieh Feriki | Vice admiral. |
| Bakshish | Gratuity. |
| Balchik | Clay. |
| Bash | Head, chief. |
| Batagin | A marsh. |
| Bazar | Market. |
| Beyaz | White. |
| Boghaz or Boghazi | A channel, strait, or estuary. |
| Burun, Burnu, or Burnar. | A cape, point, promontory, headland. |
| Buyuk | Great. |
| Capitan or captan | Commander of a ship. |
| Chai | A river. |
| Chamur | Mud. |
| Chiflik | A farm. |
| Dagh, Tagh, or Dage | A mountain. |
| Demir-yeri | Anchorage. |
| Deniz or Denizli | Sea. |
| Dere or Deresi | A valley. |
| Derin | Deep. |
| Deyirmeni | A windmill. |
| Dil | An isthmus, point, spit of sand. |
| Eski | Old, ancient. |
| Fener | A beacon. |
| Geul, Ghol, or Gol | A lake. |
| Gharb, Gharbi | West. |
| Gyumruk | Customhouse. |
| Ich, Ichereh | Inner. |
| Inshallah | Please God! |
| Irmak | A river. |
| Iskele or Tskalesi | A landing place. |
| Jami | A mosque. |
| Jenub, Jenubi | Southerly. |
| Kaba-kum | Gravel. |
| Kale | A castle. |
| Kapu | A gate, a pass. |
| Kara | Black. |
| Kaya | Bluff, cliff, rocky. |
| Kayalik | Rocky. |
| Keurfaz | A gulf. |
| Khan | An inn, hotel. |
| Kioi | A village, hamlet. |
| Kilagus | A pilot. |
| Kilisa | A church. |
| Kizil, Krimzi | Red. |
| Kyupru | A bridge. |
| Kuyu | A well. |
| Koyun | A bight, a cove. |
| Kuchuk | Small. |
| Kiurfez | Bay. |
| Kulleh | A tower. |
| Kum | Sand. |
| Kyupru | A bridge. |
| Liman | A port, a harbor, a bay. |
| Liman-reissi | Port admiral. |
| Liva | Country. |
| Maden | A mine. |
| Maghreb | West. |
| Mejjid | A small mosque. |
| Mudir | Governor of a city. |
| Moucaddess | Saint, holy. |
| Nehir | A river, a stream. |
| Nisham | A beacon. |
| Nizam | A regulation. |
| Orman | A forest, a wood. |
| Ova or Ovasi | A plain. |
| Palanka | A fort, a fortress. |
| Rakitsau | Stillwater. |
| Reis | Chief, captain of ship. |
| Sanjak | A flag. |
| Sanjak-i-Humayun | Imperial standard. |
| Sanjak sheriff | A religious flag. |
| Sarai | A palace, a house. |
| Selam | Health, a salutation. |
| Si | Of, thus: deresi, valley of. |
| Siglie | A bank, a shoal. |
| Shamandirah | A buoy. |
| Shark | East. |
| Shehr or Sheher | A town, a city. |
| Shemal | North. |
| Su | Water, stream. |
| Tabia | A battery. |
| Tiash, Tashrah | Outer. |
| Tashlik | Stony. |
| Tape or Tepesi | A hill, a tumulus. |
| Tersane | The Turkish Admiralty. |
| Terjuman | An interpreter, a drago man. |
| Togrouk | Bar of a river. |
| Vilayet | Country. |
| Yar | Bluff, cliff. |
| Yeni | New. |
| Yer | Land, country. |
| Yol | Channel, road. |
| Yukari | Up. |

# INFORMATION RELATING TO NAVIGATIONAL AIDS AND GENERAL NAVIGATION

**THE HYDROGRAPHIC OFFICE** exists for the improvement of the means for navigating safely the vessels of the United States Navy and of the mercantile marine by providing accurate and cheap nautical charts, sailing directions, navigators, and manuals of instruction for the use of all vessels of the United States, and for the benefit and use of navigators generally.

**THE PUBLICATIONS** of the Hydrographic Office for the use of mariners are: Charts; Sailing Directions; Light Lists; Radio Aids to Navigation; Notices to Mariners; Hydrographic Bulletin; Daily Memorandum; Mine Warnings to Mariners; Pilot Charts; American Practical Navigator; Useful Tables of the American Practical Navigator; Star Identification Tables; Azimuths of the Sun; Azimuths of Celestial Bodies; Arctic Azimuth Tables; Altitude, Azimuth, and Line of Position; Noon Interval Tables; The Sumner Line of Position; The International Code of Signals; Development of Great Circle Sailing; and Tables of Distances. (See General Catalogue.)

**Sailing Directions or Pilots** are books treating of certain divisions of the navigable waters of the globe. They contain descriptions of coast lines and harbors; dangers; information of winds, currents, and tides; directions for approaching and entering harbors; and much other information of interest to mariners that can not be shown on charts or is not given in other Hydrographic Office publications.

The Sailing Directions are corrected, as far as practicable, to the date of issue from the office; subsequently the mariner should avail himself of the annual supplements, which will be mailed on receipt of the coupon included for that purpose in the front of each volume. The more important corrections for the current year are published in the Notice to Mariners, and should be inserted on the proper pages of the volumes affected.

The Hydrographic Office publishes 2 volumes of Sailing Directions of the Great Lakes of North America and 56 volumes that include the remainder of the world except the coasts of the United States and its possessions, which are covered by pilots published by the

United States Coast and Geodetic Survey and issued by the Hydrographic Office to vessels of the United States Navy only.

**Light Lists** give detailed information of the position and character of lights, with a brief description of the lighthouses and of any accompanying fog signals. These publications, consisting of six volumes, revised annually, contain the latest available information of the lights of the world, except those of the United States and its possessions, and should always be consulted when information of lights is desired. They should be kept corrected to date by inserting at the appropriate places corrections published in Notices to Mariners.

Similar publications, giving full information of lights of the United States and its possessions, are published by the United States Coast and Geodetic Survey and are issued by the Hydrographic Office to vessels of the United States Navy only.

**Radio Aids to Navigation,** Hydrographic Office Publication No. 205, lists those radio stations throughout the world which perform services of value to navigation. It includes details of radio-compass stations, fog signals, weather bulletins, storm and navigational warnings, time signals, etc. For traffic stations the mariner should consult the International List of Radiotelegraph Stations.

**Azimuths of the Sun,** Hydrographic Office Publication No. 71, contains tables giving the "true bearings" of the sun at intervals of 10 minutes between sunrise and sunset between 71° N. and 71° S. This table can be applied to the moon, planets, and stars when their declinations do not exceed 23° N. or S.

**Azimuths of Celestial Bodies,** Hydrographic Office Publication No. 120, contains tables giving the "true bearings" of celestial bodies whose declinations range from 24° to 70° for parallels of latitude extending 70° from the Equator. These tables are a continuation of the tables given in the Azimuths of the Sun, and the two books together will furnish the azimuth of any body whose declination does not exceed 70°.

**Altitude, Azimuth, and Line of Position,** Hydrographic Office Publication No. 200, contains the tables necessary for working a sight of a heavenly body for a line of position, using the cosine-haversine formula and Aquino's Altitude and Azimuth Tables. In addition it contains tables for the corrections to be applied to observed altitudes of the sun, moon, stars, or planets, so that a mariner supplied with this book and a Nautical Almanac is equipped to work a sight and plot a line of position by either method.

**Noon Interval Tables,** Hydrographic Office Publication No. 202, affords a means of finding without computation the interval to noon from the morning time sight. They are useful in ascertaining the ship's run to noon and the local apparent time of noon.

**The Sumner Line of Position,** Hydrographic Office Publication No. 203, contains tables by which the hour angle and azimuth of a celestial body may be obtained by inspection and interpolation to readily lay down the Sumner line. They are arranged for use in the zone between latitude 60° N. and 60° S., employing the celestial bodies whose declinations do not exceed 27°. They are also available for use in the zone between latitude 27° N. and 27° S. for bodies whose declinations do not exceed 60°.

These tables are continued in Hydrographic Office Publication No. 204, which gives simultaneous hour angle and azimuth of celestial bodies between 27° and 63° of declination from the celestial Equator for latitudes ranging from 60° N. to 60° S.

**Star Identification Tables,** Hydrographic Office Publication No. 127, gives the simultaneous values of declination and hour angle for values of latitude, altitude, and azimuth ranging from 0° to 80° in latitude and altitude, and 0° to 180° in azimuth. These tables enable the navigator, knowing the approximate position of the ship, to indentify stars of the first magnitude by observing their bearing and altitude.

**Table of Distances,** Hydrographic Office Publication No. 117, gives the shortest navigable distance between ports. Where more than one route exists the name of and distance over the most practicable one is given. Due to the factor of safety used by the Hydrographic Office in clearing dangers and changing courses, the distances given in this book may differ by a few miles from those obtained by different computations.

**American Practical Navigator,** Hydrographic Office Publication No. 9 (Bowditch), is a complete treatise on navigation, including the tables necessary in navigation, with directions for their use. It includes chapters on kindred subjects, such as tides, marine surveying, winds, and ice. For the convenience of navigators the tables are reproduced in a separate and less bulky volume called **Useful Tables From The American Practical Navigator.**

**The Development of Great-Circle Sailing,** Hydrographic Office Publication No. 90, is an exposition of the principles relating to great-circle sailing and their practical application as developed by certain cartographers in great-circle charts.

**International Code of Signals,** Hydrographic Office Publication No. 87, describes the methods used in the International Code and is divided into three parts. Part 1 contains urgent and important signals, and all the tables of money, weights, barometric heights, etc., together with a geographical list and a table of phrases formed with the auxiliary verbs.

The second part is a signal index. It consists of a general vocabulary and a geographical index, arranged alphabetically.

The third part gives lists of the United States storm warning, Coast Guard, time signals, radio, and radio time signal stations, and of Lloyd's signal stations of the world.

It also contains semaphore and distant signal codes, the United States Army and Navy Dot and Dash, and Semaphore Codes, and the Morse Wigwag Code.

**Notice to Mariners,** containing newly acquired information relating to various parts of the world, are published weekly and mailed to all United States vessels in commission, branch Hydrographic offices and agencies, and United States consulates. Copies are furnished free by the Hydrographic Office or by any of its branch offices on application.

The Hydrographic Office undertakes by means of the Notice to furnish to navigators all essential corrections to publications which it has issued or sold.

With each Notice there is also furnished to naval vessels a separate sheet giving the items relative to lights contained in the latest Notice and necessary to correct the Light List.

**Pilot Charts** of the North Atlantic, Central American waters, and North Pacific and Indian Oceans are issued each month and of the South Atlantic and South Pacific Oceans each quarter. These charts give in graphic form available facts or conclusions from hydrography, navigation, and meteorology that will assist the mariner to choose the safest and quickest routes. Besides timely information of a varied nature, their principal features are: Average winds, currents, barometers, and percentage of gales, calms, and fog; presence of ice and derelicts; radiocompass and other signal stations; lines of equal variation of the compass for each degree and their annual change; and routes for steam and sailing vessels. They are furnished in exchange for marine data or observations.

**Hydrographic Bulletin,** a weekly publication which supplements the Pilot Charts with late reports of ice, derelicts, important aids to navigation, and miscellaneous facts of use and interest to navigators During dangerous ice conditions it contains information of all oceans and of the Great Lakes. It may be obtained free upon application.

**Daily Memorandum,** a daily publication, carries a synopsis of all important information relating to dangers and aids to navigation, including reports of ice, derelicts, etc., received up to 4 p. m. of the day of issue; circulated chiefly to the branch Hydrographic offices. Its most urgent reports are also broadcast by radio.

**Mine Warnings to Mariners** are issued from time to time regarding mine fields and routes through or near them in recent war zones. They are based on information obtained from the International Mine Clearance Committee at London. They are often supplemented by chartlets. When these mine fields are entirely swept the Mine Warnings will be discontinued.

**CHARTS.**—Charts are representations of land and water on a flat surface prepared for the use of mariners.

On account of the curvature of the earth it is impossible to give an accurate representation on a flat surface, and this has led chart constructors to use various projections, all being somewhat distorted, but sufficiently accurate for the purpose of navigation.

The projections most used by chart constructors are the Mercator, the polyconic, and the gnomonic or great circle. Each projection has certain properties which adapt it to particular uses.

**Mercator charts** are the most convenient for navigational purposes. On a Mercator chart the shapes of small areas are but little distorted; latitudes and longitudes can be plotted easily and accurately; the vessel's track is a straight line, and the angle this line makes with any meridian is the course.

However, the observed bearings are not identical with those laid down upon a Mercator chart, except the bearings north and south and east and west on the Equator, for the line of sight, except as affected by refraction, is a straight line and lies in the plane of the great circle, while the straight line on the chart, except the meridian line, represents not the arc of a great circle but the loxodromic curve, or rhumb line, which on the globe is a spiral approaching but never in theory reaching the pole. This difference is not appreciable with near objects and in ordinary navigation, but in high latitudes the bearings of distant objects, especially those lying nearly east or west, must be corrected for the convergence of the meridians before they can be used on a Mercator chart; consequently Mercator charts are rarely used in polar regions.

**Polyconic charts** have practically no distortion along the middle meridian, are well adapted to all latitudes, represent the areas of regions correctly, and permit a single scale of distances.

The meridians and parallels on polyconic charts are curved, the rhumb line is curved, and there is slight distortion as the longitude departs from the middle meridian.

**Gnomonic or great-circle charts** are useful for obtaining the great-circle course and distance and for navigating in high latitudes where the Mercator projection fails. In this projection great circles appear as straight lines. There is distortion on these charts at points some distance from the point of tangency of the plane of projection, and on them the rhumb line is curved.

**The polar chart,** a special form of the great-circle projection designed for use in the polar regions, is so constructed that the rhumb line is spiral.

**The accuracy** of any chart depends upon the character and the thoroughness of the original survey and the completeness of the information received of subsequent changes. Hydrographic Office charts are based upon the most reliable surveys obtainable, and are corrected from time to time from information received from reliable sources.

The sources and date of survey are given in the title, and the dates of extensive corrections and minor corrections are shown on the chart.

Many of the earlier surveys were incomplete and inaccurate, and charts based only upon them carry the resulting errors until later information or a resurvey furnishes the necessary corrections; so charts based on old surveys should be used with caution.

In general, it may be assumed that only surveys of well-frequented ports and their approaches have been complete and thorough enough to discover every danger.

Information in regard to remote places is always scanty, and sometimes entirely lacking; therefore charts of these places can not always be kept up to date, and should be used accordingly.

In river deltas, particularly those with mud bottoms, the channels shift from time to time and the local authorities usually change the buoyage to correspond. It is difficult to keep charts of such places correct at all times.

**The number of soundings** on a chart is an indication of the completeness of the survey, but for the sake of clearness a chart is not expected to show every sounding taken. Sparse or unevenly distributed soundings indicate that the survey was not made in detail. Blank spaces among soundings indicate that no soundings were obtained, and it may generally be assumed when the near-by or surrounding soundings are deep that in the blanks the water is also deep; but among shallow soundings or near reefs all blank spaces must be regarded with suspicion.

A complete and detailed survey may fail to find every patch or pinnacle rock, particularly among coral regions, off rocky shores, and in waters where rocks abound. A coast line should always be assumed foul unless it is shown to be clear.

**Fathom curves a caution.**—The necessities of navigation do not require and as yet have failed to provide detailed surveys of the general coasts, and on most coast charts the 5-fathom (9.1 m.) curve may be considered a danger curve inside of which it is not wise to venture unnecessarily.

On rocky shores or with deep-draft vessels it is well to regard the 10-fathom (18.3 m.) curve as such a danger curve.

A useful danger curve on well-surveyed coasts can be obtained by tracing with a colored pencil or ink the curve of depth next greater than the draft of the vessel using the chart. The edge of the sanding is a well-marked danger line for vessels of less than 18 feet draft.

Charts of localities where soundings are scarce and the bottom uneven, so that curves of equal depths can not be drawn accurately or at all, should be used with caution.

Where an isolated sounding shows less water than surrounding depths, especially when marked with a dotted ring, it should be avoided, as the spot may not have been thoroughly examined or the least depth found.

**The chart on the largest scale** should always be used, on account of its greater detail and the greater accuracy with which positions may be plotted on it. When approaching land or dangerous banks the mariner should change from the small-scale chart to the chart on the largest scale in ample time to plot the best possible fix of the vessel.

**Notes on charts** should be read with care, as they may give important information that can not be graphically represented.

**Current arrows** on charts show only the most usual or the mean direction of a current; it must not be assumed that the direction of a current will not vary from that indicated by the arrow. The velocities of currents also vary with circumstances, and those given on the charts are merely the mean of those determined, possibly from very few observations.

**Compass roses on charts.**—The change in the variation from year to year gradually introduces an error in the magnetic compass roses on charts. In some localities there is a large annual change, and with a small-scale chart failure to correct a course or bearings for this change will give an incorrect position. The date of the variation and the annual change are given on the compass rose; this information readily permits the conversion of magnetic courses and bearing into true and facilitates the use of the true compass rose, which is the best practice.

In some parts of the world the variation changes so rapidly with a change of position that frequent changes of compass course are necessary to maintain a true course. For example, in approaching New York from Liverpool on the great-circle course the variation changes over 10° in less than 600 miles.

**Local magnetic disturbance of the compass.**—Magnetic masses of minerals external to a vessel exert an effect on the compass known as "local magnetic disturbance" or "local attraction." Such disturbance of the compass in vessels at sea is sometimes experienced in different parts of the world. The adjacent land is probably not the cause of the disturbance, because the effect of a magnetic force decreases so rapidly with distance that it would require a local magnetic center of a force hitherto unknown to affect a vessel's compass even a short distance away. Magnetic minerals at the bottom of the sea under the vessel probably cause these deflections of the compass, perhaps with strong force in shallow water. The compass may be disturbed when steaming over such a spot, but the disturbance will only extend over a small space unless there are many magnetic centers close together.

**Distribution of charts.**—The Hydrographic Office prepares, issues to the United States Navy, and sells to mariners through its agents Mercator charts for general navigation, a great-circle chart of each ocean, and a polar chart of the north polar region. To the United States Navy only it issues United States Coast and Geodetic Survey charts, some Mercator, some polyconic, of the coasts of the United States and its possessions, and such other charts, mainly those of the British Admiralty, as are necessary.

All charts issued by the Hydrographic Office are corrected to date of issue and stamped to that effect on the face of the chart. On the lower margin of the chart the publication date is placed at the center, the edition date at the right, and the date of small corrections at the left.

**A chart catalogue,** giving the numbers and limits of Hydrographic Office charts, is issued to all naval vessels when commissioned and to all merchant vessels upon request.

The catalogue of charts issued by the Coast and Geodetic Survey is furnished to all naval vessels by the Hydrographic Office, and may be obtained by all other mariners directly from the Coast and Geodetic Survey.

**TIDES.**—A knowledge of the times of high and low water and of the amount of vertical rise and fall of the tide is of great importance in the case of vessels entering or leaving port, especially when the low water is less than or near their draft. Such knowledge is also useful at times to vessels running close along a coast in enabling them to anticipate the effect of the tidal currents in setting them on or offshore. This is especially important in fog or thick weather.

**Planes of reference.**—The plane of reference for soundings on Hydrographic Office charts made from United States Government surveys and on United States Coast and Geodetic Survey charts of the Atlantic coast of the United States is mean low water; on the United States Coast and Geodetic Survey charts of the Pacific coast of the United States, the Hawaiian Islands, the Philippines, and Alaska it is the mean of the lower low waters; on United States Hydrographic Office charts of the coast from Puget Sound to Alaska it is low-water ordinary springs.

The plane of reference for British Admiralty charts, based on British surveys, is, in waters where the daily inequality is small, the level of mean low-water springs, and in places where the daily inequality is considerable, the level of Indian spring low water, which is approximately the lowest possible low water, and therefore corresponds closely to the mean of the lower low waters at places having a large daily inequality.

The plane of reference for United States Hydrographic Office charts and for British Admiralty charts, based on charts of other nations, is that used by the original authority.

The plane of reference of Denmark, Norway, and Japan is mean low-water springs, of Holland is mean low water, of Germany is a definite distance below mean low-water springs, and of France and Spain is the lowest low water.

The plane of reference may be in doubt on charts compiled from old or various sources, and in such case, or whenever not stated on the chart, the assumption that the reference plane is mean low water and not low-water ordinary springs gives a larger margin of safety. There are times when the tide may fall below any plane of reference that is used on the chart. Low water is lower than mean low water about half the time, and when a new or full moon occurs at perigee the low water is lower than the average low waters of springs. On the coast of Europe the spring range is increased at the equinoxes, but in some other parts of the world, especially those places having a large daily inequality, such periodic low tides occur at the solstices.

The water may fall at times below even a very low plane of reference, owing to the wind or to a high barometer.

Much daily inequality in the tides of certain coasts causes the amount of rise and fall to be unreliable, and additional caution must be used; also the establishment for such places can not be considered reliable.

The International Hydrographic Conference of 1919 recommended for future consideration a uniform reference plane for all nations, to be called "International low water."

**Mean sea level.**—The depths at half tide are practically the same for all tides, whether neaps or springs. Half tide, therefore, corresponds with mean sea level. This makes a very exact plane of reference easily found, to which it would be well to refer all high and low waters.

If required to take special soundings for the chart at a place where there is no tidal bench mark, mean sea level should be found and the plane for reductions established at the proper distance below it, as ascertained by the Tide Tables or by observations, or in some cases, if the time be short, by estimation, the data used being made a part of the record.

**Tidal currents.**—In navigating along coasts where the tidal range is considerable, special caution is necessary. It should be remembered that there are generally indrafts and corresponding outdrafts abreast of all large bays and bights, although the current may generally run nearly parallel with the shore outside of the entrances.

The turn of the tidal current offshore seldom coincides with the time of high and low water along the shore. In some channels the tidal current may overrun the turn of the vertical movement of the tide by three hours, so that at high and low water by the shore the current is running at its greatest velocity.

The effect of the tidal wave in causing currents may be illustrated by two cases:

(1) Where there is a small tidal basin connected with the sea by a large opening.

(2) Where there is a large tidal basin connected with the sea by a small opening.

In the first case the velocity of the current in the opening will have its maximum value when the height of the tide within is changing most rapidly; i. e., at a time about midway between high and low water. The water in the basin keeps at approximately the same level as the water outside. The flood current corresponds with the rising and the ebb with the falling of the tide.

In the second case the velocity of the current in the opening will have its maximum value when it is high water or low water without, for then there is the greatest head of water for producing motion. The flood current in such cases generally begins about three hours after low water and the ebb current about three hours after high water, slack water thus occurring about midway between the tides.

Along most shores not much affected by bays, tidal rivers, etc., the current usually turns soon after high water and low water.

The swiftest current in straight portions of tidal rivers is usually in the middle of the river, but in curved portions the most rapid current is toward the outer edge of the curve, and here the deepest water will generally be found. The pilot rule for best water is to follow the outer edge of the curves or the ebb tide reaches.

Countercurrents and eddies may occur near the shores of straits, especially in bights and near points. A knowledge of them is useful in order that they may be used or avoided.

A swift current often occurs in a narrow passage connecting two large bodies of water, owing to their considerable difference of level at the same instant. The several passages between Vineyard Sound and Buzzards Bay are cases in point.

Tide rips are generally made by a rapid current setting over an irregular bottom, as at the edges of banks where the change of depth is considerable, but they sometimes occur on the high seas.

**Tide Tables,** published annually by the United States Coast and Geodetic Survey, give the predicted times and heights of the high and the low waters for every day in the year at 84 of the principal ports of the world, and from these by means of tidal differences and ratios at a very large number of subordinate ports. The tables for the Atlantic and the Pacific coast ports of the United States are also published separately. These tables predict the times of high and low water, and not the times of turning of the current or of slack water, which may be quite different.

The distinction between "rise" and "range" of the tide should be understood. The former expression refers to the height attained above the datun plane of sounding, differing with the different planes of reference; the latter to the difference of level between successive high and low waters.

Full explanations and directions for using the General Tide Tables are given in that book.

**AIDS TO NAVIGATION—Lights.**—Charts and Light Lists give the visibility of lights for a height of 15 feet (4.6 m.) of the observer's eye, and the effect of a greater or less height of the observer's eye can be obtained by the tables of distances published in all of the Light Lists.

A light is sooner sighted aloft, as there the observer's range of vision is increased, and an approximate bearing of the light may be obtained by noting while aloft a star over or nearly over the light, and later observing the bearing of the star with the compass.

Powerful lights often loom far beyond the limit of visibility of the actual rays of the light, and this must not be confounded with the true range. Refraction also often causes a light to be seen farther than under normal conditions.

On first sighting a light, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the vessel is on the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

When expecting to sight a light in thick weather, its power and color should always be considered. Haze obscures a weak or a colored light and decreases the chance of sighting it.

The distance from a light can not be estimated either by its brilliance or by its dimness, but only by its change of bearing.

When a light is sighted it should be identified at once by checking its characteristics as given in the Light List, particularly when approaching a well-lighted coast, where lights with similar characteristics are sometimes found close together.

The power of a light can be estimated by its candlepower or order as given in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range corresponding to its height. For example, a light elevated 120 feet (36.6 m.) above high water and only visible 9 miles in clear weather must be of small candlepower, for if of sufficient candlepower its height would give a visibility of over 16 miles.

**Buoys.**—Buoys do not always maintain exact positions; therefore they should always be regarded as warnings and not as fixed navigational marks, especially during the winter months or when moored in exposed waters. A vessel's position should, when possible, be plotted not by buoys but by bearings or by angles of fixed objects on shore.

**Light buoys** can not always be relied on, because the light may become extinguished or if periodic the apparatus may fail to operate.

**Whistle and bell buoys** are sounded by the action of the sea; therefore in calm weather they are less effective and at times may not sound.

**NAVIGATION.—Piloting,** in the modern sense of the word, is the art of conducting a vessel in channels and harbors and along coasts where landmarks and aids to navigation are available for fixing the position and where the depth of water and dangers to navigation require a constant watch and frequent changes of course. Piloting requires the greatest experience and nicest judgment of any form of navigation. An error in position on the high seas may be rectified by later observations, but an error in position while piloting often results in disaster. Therefore the mariner should endeavor to be proficient in this important branch, mindful that a modern, well-found vessel is usually safe on the high seas and in danger when approaching land and making harbor.

In planning to enter a strange port the mariner should give careful previous study to the chart, sailing directions, and tide tables, and should select the most suitable marks for use, providing substitutes in case those selected can not be recognized with absolute certainty. Ranges should be noted if available, and the lines drawn on the charts both for leading through the deepest water in channels and for guarding against particular dangers; for the latter purpose safety bearings should in all cases be laid down when no suitable ranges offer. The courses to be steered in entering should be laid down and distances marked thereon.

If intending to use the sextant and danger angle in passing dangers, and especially in passing between dangers, the danger circle should be plotted and regular courses planned rather than to run haphazard by the indications of the angle alone, with possible trouble from bad steering at critical points.

It should be remembered that channel buoys seen from a distance are difficult to identify, because their color is sometimes not easily distinguished, and they may appear equally distant from the observer even when at widely varying distances.

The vessel's position should be fixed at all times, even when entering ports considered safe and easy of access, and should be constantly checked, using for the purpose those marks whose identity has been established beyond doubt.

The vessel should ordinarily steer exact courses and follow an exact line as planned from the chart, changing course at precise points, and where the distance run on the same course is considerable the position should be checked at frequent intervals. This procedure is desirable even when it may seem unnecessary for safety, because if running by the eye alone and the vessel's exact position be immediately required, as in a fog or sudden squall, a fix at that particular moment may be difficult to obtain.

This habit of running exact courses with precise changes of course will also be found most useful when it is desired to enter port or pass through inclosed waters by means of the buoys alone, as during a fog. Here safety demands that the buoys be made successively, which requires, if the fog be dense, very accurate courses and careful attention to the speed of the vessel and the set of the current; failure to make a buoy when expected leaves, as a rule, no safe alternative but to anchor at once, with perhaps a consequent serious loss of time.

Changes of course should in general be made by exact amounts, naming the new course or the amount of the change desired, rather than by ordering the rudder to be put over and then steadying when on the desired course, with the danger of the attention being diverted and of forgetting that the vessel is still swinging. The helmsman, knowing what is desired and the amount of change to be made, is able to act more intelligently and to steer a good course, which is essential in narrow channels.

In passing between dangers where there are no suitable ranges, as, for instance, between two islands or an island and the main shore when the conformations of the shore line are very similar, with dangers extending from both, a mid-channel course may be steered by the eye alone with great accuracy, as the eye is able to estimate very closely the line that lies midway between.

In piloting among coral reefs or banks a time should be chosen when the sun will be astern, conning the vessel from aloft or from an elevated position forward, for the line of demarcation between the deep water and the edges of the shoals is indicated with surprising clearness.

**Coast piloting** involves the same principles as piloting in a harbor or channel, and similarly requires that the vessel's position be continuously determined as landmarks are passed.

The routes should be planned for normal conditions of weather, with suitable variations in cases of fog or bad weather, or for making points at night.

On well-surveyed coasts there is a great advantage in coasting near the land, keeping the marks and the soundings, and thereby knowing at all times the vessel's position, rather than keeping offshore and losing the marks, with the necessity of again making the land from a doubtful position, with perhaps the added inconvenience of fog or bad weather.

The danger circle for either the horizontal or the vertical danger angles should be plotted wherever the method can usefully be employed, and the angles should be marked on the chart. This practice will save many miles in rounding dangerous points, with no sacrifice of safety. Where available, ranges should also be marked on the chart, either to lead clear of dangers or to check the deviation of the compass.

In making a coastwise trip against a strong offshore or head wind it may be desirable, with trustworthy charts, to skirt the shore as closely as possible in order to avoid the heavier seas and adverse currents that prevail farther out. In some cases, with small vessels, a passage can be made only in this way. The important saving of coal and of time thus effected by skillful coast piloting makes this subject one of prime importance to the navigator. Many vessels attempting to save time or distance approach dangers too closely and get into trouble, so a mariner should always remember that the safety of the vessel is the first consideration.

In case of regular runs over the same route the courses and distances should be entered in a notebook and laid down on the chart, where they will be available for ready reference.

The officer of the watch should keep a continuous record of the progress of the vessel, entering in the navigator's notebook and ship's log book the time and patent-log reading of all changes of course and the bearings of objects, especially when abeam. In this way the reckoning is regularly kept without the presence or particular order of the captain or navigating officer. The fresh and exact position thus available is useful at all times, and is particularly valuable at night or in case of a sudden squall or fog.

**Fixing position.**—A navigator in sight of objects which are recognizable and are shown on the chart may fix his position by any of the following methods:

1. Sextant angles between three known objects.

2. Bearings of a known object and the angle between two known objects.

3. Cross bearings of two or more known objects.

4. Two bearings of a known object, separated by an interval of time, with the run during the interval.

5. Bearing and distance of a known object.

Besides the foregoing, there are three methods by which without obtaining the precise position the navigator may assure himself that he is clear of any particular danger. They are—

1. By following a range.
2. By using the danger angle.
3. By using the danger bearing.

These various methods are fully explained in most textbooks on navigation and in the American Practical Navigator, a copy of which should be in the navigator's outfit.

The existing conditions will usually determine the method to be used, but where there is a choice the method that will assure the most accurate fix should be employed.

**Deep-sea navigation.**—At sea the position of the vessel may be determined by "dead reckoning" or by observations of heavenly bodies. There are several methods used in obtaining the "dead reckoning" position and various formulas used to obtain position by observation. The American Practical Navigator gives full description of these methods and should be consulted by the mariner.

The method which should be thoroughly understood and regularly used is that employing position or Sumner lines. Hydrographic Office Publications No. 201 (Simultaneous Altitude and Azimuth of Celestial Bodies) or Nos. 203 and 204 (Simultaneous Hour Angle and Azimuth of Celestial Bodies) offer convenient methods of obtaining a line of position either by computation or inspection.

Lines of position, however obtained, give the most comprehensive information to the navigator with the least expenditure of labor and time. After working a line of position and plotting it on the chart the mariner knows the vessel must be somewhere on the line, provided the data used be accurate and the chronometer correct. As the information given by one line of position is not enough to determine the definite location of the vessel, it is necessary to cross this line by another similarly obtained, and the vessel being somewhere on each, must be at their intersection.

A single line will at times furnish the mariner with valuable information. For instance, if it points toward the coast it marks the bearing of a definite point on the shore, or if parallel to the coast it clearly indicates the distance off, and so will often be found useful as a course. When the heavenly body is abeam the line of position will be parallel to the vessel's course and will indicate whether the vessel is on the course or the distance away from the course. When the heavenly body is ahead or astern the line of position will be at right angles to the course and will indicate whether the vessel is ahead or astern of the position by "dead reckoning."

A sounding taken at the same time as the observation will, under certain conditions, prove of great value in giving an approximate position on the line.

**Crossing two lines.**—A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon in clear weather is well defined. The position lines thus obtained will, if the bearings of the stars differ 30° or more, give an excellent fix. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun, with sufficient interval to admit of a considerable change of bearing; in these cases one of the lines must be moved for the run of the vessel.

**Navigation in a fog.**—In spite of all aids to navigation, closing the land in a fog is attended with danger, and a mariner approaching the shore in a fog should first consider whether the necessity to continue is sufficiently great to justify the certain risk involved. In addition to the dangers of navigation, grave risk of collision exists in a fog, a discussion of which is not within the province of this book, but which must be duly considered by the mariner in deciding whether to enter a harbor or narrow waters during a fog. A mariner is often overtaken by a fog in narrow waters, under which circumstances there is no choice but to proceed.

If the urgent nature of the voyage justifies the attempt, or if circumstances force the vessel to continue, the mariner should proceed with caution, taking advantage of all aids to navigation.

**Taking soundings in a fog.**—Soundings at regular and frequent intervals should be taken and the depths and the character of the bottom obtained. The depths should be placed on tracing paper on the same scale as the chart and on the course steered by the vessel, and the tracing paper moved over the chart, keeping the line representing the vessel's track parallel with the course until the observed soundings and character of bottom agree or nearly agree with those given on the chart, which procedure will determine the ship's position fairly accurately. At least it will give a good indication of the position.

After entering a channel or fairway marked by buoys or other aids, endeavor to sight each buoy or aid in succession; and if unsuccessful anchor, for in narrow waters it is usually unsafe to proceed after missing a buoy.

**Aids to navigation in a fog.**—Bell buoys, whistle buoys, foghorns, either operated by compressed air or by hand, sirens, steam whistles, explosions (usually from a gun), all depend upon transmissions of sound through the air and are sometimes unreliable, because sound travels through the air in a variable manner. Apart from the influence of the wind and with no apparent reason large zones of silence often occur at varying directions and different distances from the origin of a sound, so entire dependence can never be placed upon these fog signals.

The wind may throw the sound up or down, depending upon circumstances, so lookouts should be stationed aloft, on the bridge, and on deck.

A fog sometimes creeps imperceptibly shoreward, unobserved at first by the light keeper, while a vessel enveloped in the fog confidently approaches the land, depending upon a signal which is not being sounded.

**Echoes.**—In many inland passages where the channels are narrow, or along certain coasts which are hilly and mountainous, such as occur in southeastern Alaska, it may prove useful in a fog to sound a whistle or siren and to estimate the distance offshore by the loudness or faintness of the echo as it reverberates from the sides of the hills or mountains.

**Submarine bells.**—Many light vessels are equipped with submarine bells, which are heard farther and with greater certainty than signals sounded in the air, and a vessel equipped with receiving apparatus may determine the approximate bearing of the signal. The chance of the keeper not sounding the signal exists in any system, however, and must be remembered. These signals may be heard on vessels not equipped with receiving apparatus by observers listening at the skin of the ship below the water line, but the bearing of the signal can not be as readily determined.

Vessels equipped with radio and submarine sound receivers may fix their distance from a light vessel having radio and submarine transmitters, by utilizing the difference in velocity of sound waves through water and radio waves. Sound travels 4,794 feet per second at 66° F. in water, and the travel of radio sound waves for practicable distances may be taken as instantaneous.

**Radiocompass stations.**—The most recent and perhaps the most valuable aids to navigation in a fog are the radiocompass stations.

**Use in a fog.**—In approaching land during a fog the nearest radiocompass station should be requested to furnish bearings. Usually there will be two or more stations available which will supply, through a control station, simultaneous bearings of the vessel from the different stations, which will enable the mariner to plot the vessel's position. These bearings can be furnished at frequent intervals and the position continuously checked. Under 50 miles no correction is necessary for the distortion from the true bearing inherent in a Mercator chart. All reports from mariners using these bearings indicate their accuracy within 2°, so they should always be used during a fog or poor visibility.

Where only one radiocompass station is available the mariner may fix his position by two or more bearings from the station with the distance run between, or may use it as line of position, or as a danger bearing. For a list of these stations and instructions for using them see H. O. Publication No. 205, Radio Aids to Navigation.

**Long-distance bearings.**—While radiocompass stations are primarily provided to assist the mariner in closing the land in fog or poor visibility, they may also be used to obtain positions of vessels at sea in radio range when for any reason positions by observation can not be obtained. When more than 50 miles from the shore, to plot positions accurately it is simpler to use a chart on the gnomonic projection having a special compass rose for each station; if a Mercator chart is used a correction must be applied to the bearings on account of the distortion inherent in a Mercator projection.

**Uniform system of time keeping at sea.**—A uniform system of time keeping at sea, as described hereafter, has been adopted by the navies of the principal maritime countries.

This system is intended to insure vessels at sea within certain defined limits of longitude keeping the same time in a manner similar to that now used on land. The ship's clock will therefore now be set to show the time of a definite hourly meridian, instead of being set to an indefinite time selected by the ship.

The surface of the globe is conceived to be divided into 24 staves or zones, each bounded by meridians 15 degrees of arc or 1 hour of time apart in longitude. The initial zone is the one which has the meridian of Greenwich running through the middle of it, and the meridian 7½° east of Greenwich and 7½° west of Greenwich marking its eastern and western limits. It is called the zero zone because the difference between the standard time of this zone and Greenwich civil time is zero. Each of the zones in turn is designated by a number representing the number of hours by which the standard time of the zone differs from Greenwich civil time.

The zones lying in east longitude from the zero zone are numbered in sequence from 1 to 12, and are called minus zones, because in each of them the zone number must be subtracted from the standard time in order to obtain the Greenwich civil time. The zones lying in west longitude from the zero zone are likewise numbered in sequence from 1 to 12, and are called plus zones, because in each of these zones the zone number must be added to the standard time in order to obtain the Greenwich civil time.

The twelfth zone is divided medially by the one hundred and eightieth meridian (the line separating the meridians of east longitude from the meridians of west longitude), and the terms minus or plus are used in this zone.

The number of a zone prefixed by the plus signs, thus, +, or by the minus sign, thus, —, constitutes the "zone description" of the time of that zone.

In the vicinity of the land the boundaries between zones are modified so as to be in accord with the boundaries of the countries or regions using corresponding times. In actual practice the boundaries of time zones on land are determined by the frontiers of countries, and agree generally with those at sea which are now defined by the meridians of 7½°, 22½°, etc., except when modified as necessary by the territorial limits of the countries concerned.

A graphic representation of this system will be found on Chart 5192, Time Zone Chart of the World, published by the Hydrographic Office.

**Use of oil for modifying the effects of breaking waves.**—Experience has proved the usefulness of oil in modifying the effect of breaking waves and has developed simple and effective methods of using it.

The principal facts developed to date are:

(1) The heaviest and thickest oils, notably animal and vegetable oils, are the most effective. Crude petroleum is serviceable and should be used when no better oil is available; it may be improved by mixing with other oils. Refined kerosene is of little value.

(2) In cold weather oils thicken and do not spread freely. This tendency to thicken may be reduced by thinning a heavy, sticky oil with petroleum.

(3) A small quantity of oil suffices if it can be made to spread to windward.

(4) Oil spreads very slowly, so a vessel with engines stopped or running slowly before a sea can make a slick to windward but not to leeward, except perhaps close alongside, for the vessel's drift or speed will exceed the rate of spread of the oil.

(5) The effect of oil on free waves—that is, on waves in deep water—is greatest.

(6) The effect of oil on a surf or waves breaking on a bar where a mass of shallow water is in actual motion is less than on free waves, but oil is of some service under these conditions.

(7) A vessel at sea will get the best results by drifting or running slowly before the sea and distributing oil either from canvas bags filled with oakum saturated with oil and slung over the side into the sea or from the waste pipes.

(8) In crossing a bar in heavy weather oil in considerable quantities is needed on both sides of the vessel for a very short time. A convenient method in this situation is to trail a hose over the bow and pour oil freely through it. A funnel attached to the hose will facilitate the operation.

(9) In crossing a bar with flood current pour oil overboard and allow the oil to float in ahead of the vessel. To an entering vessel crossing a bar with an ebb current oil is of little use.

(10) Oil is useful to vessels and boats when running, or lying to, or in wearing.

(11) A vessel riding to a sea anchor can fasten an oil bag to an endless line rove through a block on the sea anchor. This method distributes the oil ahead and provides a means to haul the bag aboard for refilling.

(12) Before boarding a wreck have the wreck use oil freely on both sides, if able to do so. If the wreck can not use oil, rescuing vessel should first pass to leeward of the wreck, using oil freely to form a slick into which the wreck will drift.

If the wreck be aground the attending circumstances will indicate the methods to be used.

(13) In lowering or hoisting boats in heavy weather, in port or at sea, oil will greatly assist the operation.

(14) In towing another vessel in a heavy sea oil should be distributed from the towing vessel forward and on both sides; if it is only distributed from the afterpart of the towing vessel only the tow is benefited.

## CHAPTER I

### THE DARDANELLES, SEA OF MARMARA, BOSPORUS, BLACK SEA, AND SEA OF AZOV—GENERAL REMARKS—COMMUNICATION—PILOTS—CLIMATE—WINDS AND WEATHER—WATER LEVEL—CURRENTS—FOGS

**GENERAL REMARKS.**—This volume contains sailing directions for the Dardanelles, Sea of Marmara, Bosporus, Black Sea, and Sea of Azov. Commencing at the western entrance to the Dardanelles, the European and Asiatic shores are described in the order given.

**The Dardanelles,** leading from the Ægean Sea into the Sea of Marmara, separates Europe from Asia. The length of the strait, in a general northeast and southwest direction, is 35 miles; its breadth, averaging about 2 miles, varies from $\frac{7}{10}$ mile at its narrowest part to 4 miles at its widest. The depth in mid-channel is from 25 to 55 fathoms (45.7 to 100.6 m.). The European side of the strait is for the most part steep-to, but the Asiatic shore is fringed almost throughout its length by a shallow bank extending in some places upward of ¼ mile from the land.

There is a marked difference in the conformation of the two shores of the Dardanelles. The coast of Asia, generally flat toward the sea, extends in the form of an amphitheater to the foot of Mount Ida. This extensive plain, watered by numerous springs, is fertile and well cultivated, and ledges border the Asiatic coast line, which affords bays and roadsteads, most of which are good and easy of access.

The European coast is generally high, and almost without exception steep-to. Partly from its cliffy character and partly from its superior cultivation, it presents at times an uniformly yellow and apparently arid aspect. The Asiatic, less steep and more thinly populated, affords, by its wooded hills and tree-covered plains and valleys, an agreeable relief to the yellow glare of the northern side.

**The Sea of Marmara,** united to the Black Sea by the Bosporus and to the Ægean Sea by the Dardanelles, is about 110 miles in length from east to west, without reckoning the deep gulfs of Izmid and Mudania, and 40 miles in breadth in its widest part from north to south. The width at the western end for about 30 miles eastward of Gallipoli is from 3 to 10 miles. From Gallipoli the north shore trends northeastward a distance of 60 miles, and then turns eastward for 57 miles to Constantinople. The south shore trends in an easterly direction for about 110 miles, then turns toward the north and joins the north shore at the Bosporus, thus forming an extensive gulf. Its general easterly direction is broken in two places, by a projection of land to the northward between Tarsana Burnu and Kara Burnu, and by the peninsula of Artaki.

The Sea of Marmara is bordered almost throughout its length by high and mountainous land and is terminated to the eastward by two deep gulfs, of which one, that of Ismid, is 26 miles in length, and the other, that of Mudania, 17 miles. These two gulfs are separated by a high peninsula. There are two other smaller gulfs on its south coast, one to the eastward and the other to the westward of Artaki Peninsula.

The islands of the Sea of Marmara are divided into four groups. The first is perceived on entering from the Dardanelles, and lies a short distance to the northwestward of Artaki Peninsula.

The most important island of this group is that of Marmara, which has given its name to this sea and divides it into two channels of unequal breadth. The channel to the northward is formed by the coast of Europe and the island of Maramara, and is from 10 to 18 miles in breadth; the other, formed by the island of Marmara to the northward and the islands of the group to the southward, varies from 2½ to 5 miles in breadth.

The second group is the Princes or Prinkipo Islands, and is composed of nine islands, of which the largest, Prinkipo, has given its name to the group. They lie parallel with the coast 6 miles southeast of Constantinople.

The third is Kalolimno Island, which lies off the entrance of Mudania Gulf and abreast of the mouth of the Mikhalich River.

And lastly the little islands of Mola, which are three in number and lie off the eastern point of Artaki Peninsula.

In its eastern portion the Sea of Marmara attains a considerable depth; depths of 650 fathoms (1,188.7 m.) being found at a distance of 7 miles southwestward of Princes Islands, and over 700 fathoms (1,280.2 m.) between the Artaki Peninsula and the coast of Europe. Elsewhere depths of 30 to 40 fathoms (54.9 to 73.2 m.) are found at distances varying from 5 to 10 miles from the shore.

**The Bosporus** may be said to begin at Seraglio Point on the European shore and the town of Skutari on the Asiatic shore, and to terminate at the entrance of the Black Sea at the two capes on which are built the lighthouses of Rumeli and Anatoli. Its length from the Sea of Marmara to the Black Sea, including its numerous windings, is about 17 miles, the breadth varies from 800 yards to 1½ miles, and the general direction is south-southwest and north-northeast. Like the Dardanelles, it resembles a river with abrupt and angular windings, the projecting points of which break the impetuosity of its stream, quiet its surface, and afford shelter under their lee. The northern part of the Bosporus, however, from Buyukdere to the Black Sea is straight and its general direction is northeast. The depths in the Bosporus are from 20 to 66 fathoms (36.6 to 120.7 m.) over a mud bottom.

At Old Seraglio Point the Golden Horn, the harbor of Constantinople, opens out, the waters of which present a scene of great activity from the steam vessels and numerous local craft always present. On its south shore stands the city of Constantinople, and on its north shore the towns of Tophane, Galata, and Pera, which lie close to each other and appear as one, being built on the same hill.

Both shores of the strait are studded with painted houses, many being magnificent palaces, in a quaint and picturesque manner. The European side is covered with them throughout its length, but on the Asiatic shore they are separated by rather longer intervals, and are everywhere backed by hills whose rich vegetation admirably varies this noble spectacle.

On both sides of the northern end of the Bosporus are numerous fortifications, built at different times and in various styles.

**The Black Sea,** named Kara Deniz by the Turks and Chernoe More by the Russians, is said to have received its name from the Turks, who, being accustomed only to the navigation of the archipelago, where the numerous islands and their convenient ports afford many places of refuge in case of danger, found the traversing of such an open expanse of waters, subject to storms, very perilous, and accordingly they expressed their fears by the epithet "black." The Greeks, on the contrary, gave it the name of Euxine, or hospitable.

This sea, which divides the southern Provinces of Russia from Anatolia, or Asia Minor, lies between the parallels of 41° and 46° 30′ N. and the meridians of 27° 30′ and 41° 45′ E. Its length, from Burgas on the west coast to St. Nikolaya on the east, is about 630 miles, and its greatest breadth, from the Milan Su to Odessa, is 330 miles; but it is much narrowed in the middle by the projecting peninsula of the Krimea, which reduces the breadth to about 144 miles. It is bounded on the west by Turkey, Bulgaria, and Rumania; on the northwest and north by South Russia; on the east by the Russian Provinces of Circassia and Transcaucasia; on the south by Asia Minor; and it is connected with the Sea of Azov by the Kertch Strait, and with the Aegean Sea and the Mediterranean by the Bosporus, the Sea of Marmara, and the Dardanelles. By the first it receives the drainage of a part of southern Russia and by the second it sends off the surplus waters which are not lost by evaporation. As the area which drains into the Black Sea is of an irregular ovate form and said to comprehend

960,000 square miles, while the surface area of the sea contains only 180,000, it follows that each square mile of its surface receives the drainage of 5⅓ square miles, which will account for the small degree of saltness of its waters. The specific gravity of the surface compared with that of fresh water is as 1,014 to 1,000; that of the Baltic is 1,004, while that of the water of the Atlantic is 1,026 to 1,000. The specific gravity of the bottom water close to the Bosporus is 1,020.

The deepest water found in the Black Sea is 1,227 fathoms (2,243.9 m.), near the parallel of 43° N. and on a line joining Kerempe Burnu and Cape Khersonese. Soundings taken on the Caucasian coast show deep water of about 1,000 fathoms (1,828.8 m.) at 20 miles, and from 300 to 500 fathoms (548.6 to 914.4 m.) at 10 miles from the shore.

The bottom in the central portion consists of bluish-gray or blue mud. Near the coast it is mud mixed with shells, and in places with sand and shingle.

The following rivers discharge into the Black Sea: On the north, the Dnieper and Bug; on the west, the Dniester and Danube; on the east, the Kuban by its southern branch, the Kodor, Khopi, and Rion; on the south, the Chorokh and Kizil Irmak.

In the whole of the Black Sea there are only three islands, Fidonisi, Berezan, and Kirpen. Fidonisi is situated off the mouth of the Danube; Berezan off the mouth of the Dniester; while Kirpen or Kefken is 50 miles eastward of the Bosporus. They are rocky and of inconsiderable size.

The waters of the Black Sea have considerable effect on the temperature of the air on its shores, moderating both the high summer and low winter temperatures, raising the temperature in the autumn and lowering it in the spring.

Although the temperature of the surface waters of the Black Sea changes with the seasons, below 200 fathoms (365.8 m.) it is fairly constant at 48° F.

The shores of the Black Sea are varied in aspect. On the southwestern shore, from Cape Rumeli to Cape Caliacra, in Bulgaria, the shore is of moderate height, backed by mountains, mostly of picturesque appearance. The coast thence, including the delta of the Danube, is low, slightly increasing in height towards the Krimea. This peninsula, as also the coasts of Circassia, Armenia, and Anatolia, are bordered by lofty mountains.

The northern shore of the Black Sea has many estuaries and lakes, partly separated from the sea and quite salt.

**The Sea of Azov** lies between the parallels of 45° 17′ and 47° 17′ N. and the meridians of 34° 51′ and 39° 19′ E. Its length on the parallel of 46° is about 130 miles, and its breadth on the meridian of 37° 19′ is about 100 miles. From Kertch Strait to the Don River is 160 miles. Its extreme length from the Tonka of Arabat (the southwest extremity) to the Egurcha mouth of the Don is about 200 miles.

The northern shore of this sea is from 90 to 130 feet (27.4 to 39.6 m.) in height and of a reddish appearance; its surface is flat, with a few hillocks. Extensive spits of sand, bordered by banks, are formed around all the promontories, and, being subject to the influence of the water from the Don, trend to the westward.

Its eastern shore, from Temryuk Bay to the Don River, inhabited by the Black Sea Cossacks, is low and divided by lagoons. The western shore is formed by a narrow and long sandy peninsula, named Tonka or Stryelka, that separates this sea from the Sivash or Putrid Sea, which receives several of the Krimean rivers and where salt is made. A part of the Krimea and the island of Taman form the southern shore, on which are some hills that serve as landmarks.

The districts bordering on the Sea of Azov are remarkable not only for their agricultural riches, but also for the large mineral resources they possess in the coal and iron fields of the Don and Donets Basins, and in the oil districts of the Kuban River. Owing, however, to the shallow nature of the sea, ice, and the fact that in many instances it is not possible for a vessel to load within several miles of the actual towns, the trade of the Sea of Azov ports is much hampered.

Fresh-water fish abound in all parts of the sea.

The greatest depth of this sea is about 48 feet (14.6 m.), between Kertch Strait and Berdyansk Point on its northern shore, but diminishes greatly in the Gulf of Taganrog, having a depth of about 30 feet (9.1 m.) at its entrance and 10 feet (3 m.) in the roadstead of Taganrog; the bottom is ooze, with shells, and near the shore sand and shells. By observations it is said that from 1706 to the year 1808 the depth of the gulf diminished 3 feet (0.9 m.); from the latter date to 1833 it again diminshed 3 feet (0.9 m.) so that it has lost 6 feet (1.8 m.) depth in 127 years; but there appears some reason to doubt the accuracy of this decrease in depth. The sand banks have also increased in extent and others have formed, but they are fairly charted.

The bottom is of mud mixed with shells, which are generally black, but of a reddish color along the eastern shore. The water is of a dull yellow color, but the quantity poured into it from the Don River makes it always fit for use at some distance to the westward of Taganrog.

The principal rivers which empty themselves into this sea on the northern shore are the Don and the small rivers Mius and Kalmius; on the east the Yeya (Eya), which flows into Yeiski Liman, and the Karakuban, the northern branch of the Kuban.

The only islands in the Sea of Azov besides Biryuchi Island, the southern portion of Thedotova Spit, are the Peschanie group, situated 9 miles northward of Yeisk, and Cherepakha Islet, which was reclaimed by order of Peter the Great, at 1 mile southward of Taganrog. These islets are so low that they are sometimes covered by the sea.

**Communication—Steamships.**—Facilities for communication by regular steam vessels with the Dardanelles, Bosporus, and Black Sea are numerous, and much augmented during the summer months by steamers carrying grain. From Odessa there is a regular service to the Krimea and Russian ports in the Caucasus, but during the winter months steam vessels run less frequently.

**Telegraphs.**—The telegraphic service in the Dardanelles, Bosporus, and Black Sea is good. Chanaq and Constantinople are in communication by cable with all parts of the world, and telegrams to Great Britain may be sent in English. Most places of any importance in the Marmara, Black, and Azov Seas are in telegraphic communication.

At certain signal stations telegrams can be received from vessels by International Code and forwarded to their destination.

**Signal stations.**—There are signal stations at Ochakov Point, Parutino (Bug River), Tendra Spit, Cape Tarkhankut, Cape Khersonese, Cape Aitodor, Cape Chauda, Kiz Aŭl Point, and other places. Telegrams received from vessels by International Code will be forwarded to their destinations, to be paid for by the receiver.

**Standard time** kept in Turkey and in European Russia is that of the thirtieth meridian, or 2h. 00m. 00s. east of Greenwich.

**Calendar.**—On February 14, 1918, the Russian calendar (old style) was abolished and the Gregorian (new style) calendar adopted.

**Coal** is obtainable at most of the principal ports, the details of which will be found in the body of the work.

Black Sea coal may be purchased at Sungul and Bender Eregli direct from the mines; it is stated to be of good quality. On the north shore of the Sea of Azov the coal mines of the Donets Basin, for which Mariupol is the port, are said to be inexhaustible.

**Weights, measures, and coin values—Turkey.**—The metric system has been in official use since 1870, but the old native standards of weight and measure are still widely used in the domestic trade. English units also are widely understood in foreign-trade circles. The principal units of the old native standards are defined below.

**Weight:**

1 oke=1.28 kilos=2.8264 pounds.
1 batman=6 okes=16.958 pounds.
1 kantar=44 okes=124.3616 pounds.
1 cheki=195 okes=551.148 pounds.
1 kileh=20 okes=56.528 pounds.
1 miskal (essence of rose)=74.171 grains.

**Measure:**

1 arshin (cloth)=26.96 inches.
1 arshin (land)=29.83 inches.
1 endazeh (1 pik)=25.555 inches.
1 dunum=1,098.765 square yards=0.227 acre.
1 jerib (hectare)=2.47 acres.

**Coin values:**

Gold—

£T1=$4.40.
£T5=$22.00.
£T2½=$11.00.
£T½=$2.20.
£T¼=$1.10.

Silver—

100 piaster=£ T1=$4.40.
1 piaster=$0.044.
1 Mejidieh=20 piasters.
½ Mejidieh=10 piasters.
¼ Mejidieh=5 piasters.

There are also 2-piaster and ½-piaster pieces; and coinage of 5-piaster, 10-piaster, and 25-piaster pieces was provided for on June 22, 1925.

**Bulgaria.**—The monetary unit is the leva (100 stotinki) The leva has the same value as the French franc, $0.193. There are a few Bulgarian gold coins of the value of 100, 40, 20, and 10 leva, but the gold circulation is chiefly supplied by foreign 10 and 20 franc pieces. The silver coins are ½ leva, 1 leva, 2 leva, and 5 leva; the nickel coins are 2½, 5, 10, and 20 stotinki; the bronze coins are 1, 2, 5, and 10 stotinki. The notes of the national bank circulate at par.

The metrical system of weights and measures is officially adopted in Bulgaria, but is not exclusively in use.

**Rumania.**—The monetary unit is the leu (100 bani or centimes). The gold leu has the same value as the French franc, $0.193. The gold coins are 20, 10, and 5 lei pieces; the nickel coins are 5, 10, and 20 bani. There is also a large circulation of the notes of the national bank.

The metrical system of weights and measures is in force, but the old Turkish system is to some extent in use.

**Russia.**—The currency and the system of weights and measures used in Russia are as follows:

***Money:***

The legal unit of money is the rouble of 100 kopecks. In official calculations 8.47 roubles are taken as equal to the British pound sterling, $4.8665. One chervonetz (gold) equals 10 gold roubles.

The currency in circulation consists of: (1) Chervonsti notes in denominations of 1, 3, 5, 10, and 25, issued by the state bank against gold cover, but inconvertible at present; (2) treasury notes in denominations of 1, 3, and 5 gold roubles; (3) silver coins, either bank silver (90 per cent silver and 10 per cent copper) in denominations of 1 rouble and 50 kopecks, or change silver (50 per cent silver and 50 per cent copper) in denominations of 20, 15, and 10 kopecks; (4) copper coins in denominations of 1, 2, 3, and 5 kopecks.

*Weights and measures:*

1 zolotnik=2.41 drams avoirdupois.
1 funt=0.9028 pounds avoirdupois.
1 pud=36.113 pounds avoirdupois.
10 puds=1 berkovitz=361.723 pounds avoirdupois.
1 packen=1,083.382 pounds avoirdupois.
1 vedro=3.25 gallons.
3 vedros=1 anker=9.75 gallons.
1 bochka=129.9 gallons.
1 chetverik=2.885 pecks.
1 pajak=1.442 bushels.
1 last=11.540 bushels.
1 vershok=1.75 inches.
8 vershok=1 stopa=14 inches.
2 stopa=1 arshin=28 inches.
3 arshin=1 sazhen=7 feet.
500 sazhen=1 verst=0.66 miles.
1 marine sazhen or fathom (used only for expressing depths)=6 feet.

The metrical system of weights and measures is to be introduced gradually. It was adopted in January, 1924, and will be completed by January, 1927.

**Pratique.**—A vessel entering from the Mediterranean going straight through to a Black Sea port without stopping must secure pratique at Chanaq. She does not stop at Kavak, merely making her number in passing.

A vessel entering from the Mediterranean bound for Constantinople must stop at Chanaq to secure pratique, and upon arrival in Constantinople must fly the quarantine flag until pratique has been obtained from the health office at Galata Bridge.

A vessel passing through the straits from a Black Sea port to the Mediterranean must stop at Kavak and secure pratique. Having done this it is not necessary to stop at Chanaq, but she will display her signal number in passing.

A vessel bound for Constantinople from a Black Sea port must secure pratique at Kavak and upon arrival in Constantinople must fly the quarantine flag until pratique has been obtained from the health office at Galata Bridge.

A vessel having been at Constantinople and having obtained a bill of health before departure does not have to stop at either Chanaq or Kavak on the way out, but does display her signal number in passing.

**Regulations for merchant vessels calling at Russian ports.**—See Appendix VII, page 443.

**PILOTS.**—Pilots for the Black Sea may be obtained at Chanaq, and they are sometimes engaged at Constantinople by masters of vessels proceeding to the Black Sea and Sea of Azov. This practice is said to be fraught with considerable risks, as there are few, if any, competent pilots for the navigation of those seas to be obtained at

Constantinople, the men who call themselves pilots being mostly stevedores and interpreters.

**Pilot vessels.**—The following regulations respecting pilot vessels have been adopted by the Russian and Turkish Governments:

Pilot vessels, when engaged on their stations on pilotage duty, shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed 15 minutes.

On the near approach of or to other vessels they shall have their side lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side nor the red light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand, ready for use, a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above.

A steam pilot vessel exclusively employed for the service of pilots licensed or certified by any pilotage authority or the committee of any pilotage district, when engaged on her station on pilotage duty and not at anchor, shall, in addition to the lights required for all boats, carry at a distance of 8 feet (2.4 m.) below her white masthead light a red light, visible all around the horizon, and of such a character as to be visible on a dark night with a clear atmosphere from a distance of at least 2 miles, and also the colored side lights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and at anchor she shall carry, in addition to the lights required for all pilot boats, the red light above mentioned, but not the colored side lights.

Pilot vessels, when not engaged on their station on pilotage duty, shall carry lights similar to those of other vessels of their tonnage.

**Pilot and tug services in Turkish waters.**—The pilot and tug services have been transferred to the Ottoman Steam Navigation Department of Constantinople, and regulated as follows:

(*a*) *Pilot service.*—This service is performed in the Dardanelles, Sea of Marmara, waters of Constantinople, and in the Bosporous.

The pilot stations are at Seddul Bahr, Gallipoli, Constantinople, Skutari, and Anatoli Kavak.

These stations, besides a corresponding number of ship pilots, have at the disposition of steamships some tugs and motor vessels.

Pilotage is compulsory for all steamships.

(*b*) *Tugs.*—A tug is compulsory for all steamships of greater displacement than 300 tons, and for sailing ships of more than 50 tons displacement, arriving at and sailing from Constantinople and the Golden Horn.

**Pilots for the Danube.**—Pilots for the Danube may also be obtained at Chanaq, Dardanelles. A bargain must also be concluded with them; there is no fixed price.

There is a large staff of pilots at Sulina, mouth of the Danube, 16 of whom are exclusively set apart for piloting vessels into the Sulina mouth, and there are numerous pilots for the upper portion of the river. The pilots meet vessels about 1½ miles outside the mouth.

**Pilots in Russian waters.**—See Appendix VII, page 443.

**Pilotage in the Sea of Azov** is compulsory.—Captains of vessels engaging an unauthorized pilot will incur the payment of the pilot fee to the Association of Azov Pilots, who have the exclusive rights of conducting ships from the Yenikale Roads to ports and roads of the Sea of Azov and back.

The presence of a pilot on board a vessel does not exonerate a captain from the responsibility for managing his vessel. According to the new aspect of the law enunciated by the senate, it is established that a pilot, and consequently also a pilot's association, is liable solely for mischance to a vessel due to the dangers of the channel, while the responsibility of any accident unconnected with the peculiarities of a fairway, and in particular for collision with another vessel, lies wholly on the captain of the vessel.

**Steering rules.**—The system of steering commands, in which the terms "starboard" and "port" signify that the vessel's head is to go to starboard and port, and not the helm, has been adopted by Russia.

**UNIFORM SYSTEM OF BUOYAGE—Caution.**—Too much dependence must not be placed on the buoys mentioned in this Pilot maintaining the positions assigned to them.

**Turkish waters.**—The starboard side of the channel is that side which lies on the starboard side of a vessel entering a port or river from seaward or in a strait when proceeding with the main stream of flood; the port side is that side which lies on the port hand of a vessel under the same conditions.

In the Dardanelles and Bosporus the Asiatic shore is considered the starboard side of the channel and the European shore is considered the port side of the channel.

The starboard side of a channel is marked by conical buoys painted red, and if carrying a top mark it is spherical in shape.

The port side of a channel is marked by truncated conical buoys painted black, and if carrying a top mark it is cylindrical in shape.

Shoals situated in the center of a channel are marked at each end by a spherical buoy, the outer buoy surmounted by a diamond shape and the inner buoy by a triangular shape. If the bank is extensive its sides are marked respectively by port hand and starboard hand buoys, but as these buoys may become invisible on account of their inclination produced by the effect of the winds, top marks are added.

Mooring buoys are of horizontal or vertical cylindrical shape, painted red, and numbered.

Buoys marking the ends of submarine cables are similar in shape to mooring buoys and carry a staff painted in various colors.

Telegraph cable buoys are painted black with an inscription in white Turkish characters.

Buoys marking mine fields are cask buoys painted red with white bands.

Wreck buoys are painted green with an inscription in white Turkish characters.

Spar buoys are used to mark the channels in small rivers.

Fixed beacons when used to mark banks, rocks, or the sides of a channel have top marks of various shapes and colors.

**Russian waters.**—The new buoyage system on the Russian shores of the Black Sea and in the Sea of Azov is based on the relation which the aid bears to the danger it marks. A system of colors and top marks is employed as follows:

The northern side of a danger is marked by a white buoy with black basketwork broom top mark, point up.

The southern side of a danger is marked by a red buoy with red basketwork broom top mark, point down.

The east side of a danger is marked by a red and white buoy with a top mark consisting of two red basketwork brooms, points together.

The west side of a danger is marked by a black and white buoy with a top mark consisting of two black basketwork brooms, bases together.

Buoys painted red and white in horizontal bands, with top mark consisting of a cross over a black basketwork ball, may be passed on either side.

In the Bug-Dneiper estuary, in the curve of the entrance of the Berezan-Ochakov Channel to the eastward, in Kertch-Yenikale Strait, and in the Sea of Azov northward of the parallel of the Kiz Aul Lighthouse the old marks are left temporarily.

**Winter buoyage.**—During the winter all buoys are replaced by spar buoys.

In the Black Sea it is the custom in November to remove the light vessels and buoys in Kherson Bay, Kertch Strait, and the Sea of Azov, their positions being marked by spar buoys of the same color. When navigation is resumed in the spring (about April) the light vessels and buoys are again laid out.

**Lights.**—During the winter the shore lights of the Black Sea and Sea of Azov will cease to be lighted as soon as the whole visible horizon therefrom shall be covered with solid ice. The lights will again be exhibited as soon as open spaces are seen or the ice appears to begin to move; should a vessel be seen at that time, even if the movement of the ice be arrested, the lights will not be discontinued unless the crew have abandoned the vessel and communication can not be effected. For fog signals see page 33.

**Fishing vessels' lights.**—Fishing vessels and fishing boats in Russian waters show the lights prescribed for fishing vessels by the International Regulations for Preventing Collisions at Sea.

**Light vessels.**—Light vessels and pilot vessels in Russian waters fly at the stern a blue ensign with the national flag in the upper quarter, and at the main, under the ball, a yellow flag with an upright blue cross.

**Coast Guard vessels.**—The vessels of the Russian Coast Guard Service, when entering or leaving harbor at night, exhibit at the peak a white light with a blue light underneath it.

**Caution.—Moored mines** still exist in certain areas in the Black Sea. For a delineation of these areas and information respecting navigation in their vicinity the navigator should consult the Mine Warnings to Mariners published by the Hydrographic Office.

**Wrecks.**—In some parts of the Black Sea, notably the Bug River, and the eastern basin of th Sea of Azov near Taganrog, wrecks frequently occur through vessels being nipped by the unexpected appearance of ice, and so become, in some cases, floating wrecks. When stationary they are generally buoyed and removed as soon afterwards as practicable, and those floating in time become dispersed by the action of the sea; but in the early part of the year, after the opening of navigation, a careful lookout should be kept for these floating wrecks, which have no known position; also for those that may not be buoyed. In the Danube wrecks that impede navigation are destroyed by dynamite.

**SIGNALS—Radio—Distress.**—Vessels in distress shall make use of the following signal, . . . — — — . . ., repeated at short intervals and accompanied by the necessary particulars. As soon as a station receives a call of distress it must stop all exchange correspondence, and should resume the same only on being satisfied the communication consequent on the call for help is finished. Stations hearing the call of distress must act according to the indications given by the vessel which makes the call in the matter of the sequence of messages or their cessation. If at the end of a series of distress calls is added the call signal of any particular station the reply to such a call is to be made only by that station, unless that station does not reply. If the distress call does not indicate any particular station every station receiving the call must reply.

**Aircraft—Distress signals.**—When any aircraft is in distress and requires assistance the following signals will be displayed by her, either together or separately:

1. The International signal SOS, by means of visual or radio telegraphy.
2. The International Code signal of distress indicated by NC.
3. The distant signal consisting of a square flag having above or below it a ball or anything resembling a ball.
4. A continuous sounding with any sound apparatus.
5. A signal consisting of a succession of white Very's lights, fired at short intervals.
6. A white flare from which at intervals of about 3 seconds a white light is ejected into the air.

These signals are subject to such modification as shall be published from time to time.

**Warning signals.**—When a vessel is seen standing into danger the usual flag signal is made from the Russian light vessels in the Black Sea and Sea of Azov; in addition these light vessels will fire signal rockets giving two reports until the vessel observes the signal. By night the rockets alone will be used.

**Fog signals.—Fog bells** at Russian lighthouses and light vessels are sounded, unless otherwise stated, in the following uniform method:

(*a*) *At lighthouses.*—In groups of double strokes, the interval between the groups being not more than three minutes.

(*b*) *On board light vessels.*—In groups of triple strokes, the interval between the groups being not more than two minutes.

When the fog signal of an approaching vessel is heard, the intervals between the double and the triple strokes in the groups are reduced and the bell sounded continuously in double or triple strokes until the vessel is past the light or clear of danger.

The above method of sounding fog bells has been introduced in order that the bells of churches near the coast may not be mistaken for fog signals.

**Storm signals.**—The following storm signals are made at the principal ports and lighthouses in the Black Sea and the Sea of Azov.

The signals are shown for 48 hours, unless instructions are received to lower them before that time has elapsed; also the cause assigned for hoisting each signal is posted up at the respective signal stations.

| Signal | Signification |
|---|---|
| By day, triangle, point up<br>By night, three lights in form of a triangle, point up. | Gale probable, commencing at northwest. |
| By day, triangle, point down<br>By night, three lights in form of a triangle, point down. | Gale probable, commencing at southwest. |
| By day, two triangles, points up<br>By night, one light above three lights in form of a triangle, point up. | Gale probable, commencing at northeast. |
| By day, two triangles, points down<br>By night, three lights in form of a triangle, point down, above a single light. | Gale probable, commencing at southeast. |
| By day, two triangle, bases together<br>By night, one light above three lights in form of a triangle, point down. | Strong gale. |

The hoisting of any of the above signals indicates that the atmospheric conditions are such that in the neighborhood of the station the wind in the course of a short period of time, up to 48 hours, may attain the force of a gale from the quarter indicated by the signal.

The places where storm signals are shown is noted against them in the body of the book.

**CLIMATE—Dardanelles.**—Although the climate of the Dardanelles may be considered as generally good, during summer and autumn, in the neighborhood of swamps, the miasmatic exhalations rising from them produce fevers. Chanaq is said to be free from climatic disease, and the climate of Gallipoli very healthy; whereas Lapsaki, on the opposite side of the strait, is stated to be the reverse, which is probably due to the swampy nature of the land in the vicinity.

The fever and ague, caused by malaria or marsh poison, is to be apprehended over most parts of Asia Minor from the end of April to the end of September; or in exceptionally healthy years, from the end of May to the middle of September; and although low ground is to be avoided during that season, moderately elevated land is not necessarily exempt from these malarious exhalations, which may be brought by the wind blowing over pestiferous marshes.

**Constantinople.**—The climate of Constantinople depends greatly on the direction of the winds, as those from the Black Sea are generally cold and charged with moisture, while the winds from the Sea of Marmara render the atmosphere soft and genial. The weather is very variable, and during the winter months heavy falls of snow are often experienced.

**Black Sea.**—In the Black Sea the severe winters are succeeded by pleasant summers, especially on the south coast of the Krimea, where the warm, clear atmosphere is favorable to the cultivation of the vine. At Varna the mean winter temperature of the months of December, January, and February is about 34°; the summer mean temperature of June, July, and August 75°; and the annual mean 55°.

At Odessa in the same months of winter and summer the means are 25.2° and 70.7°, respectively, with a mean annual temperature of 49.3°, and in the Caucasus the climate is at all seasons very pleasant, the means of winter, summer, and annual temperature at Tiflis in the same months being 35.6°, 73.9°, and 55.2°. About Batum and Poti the coast has the reputation of being exceedingly unhealthy, and in some parts of Anatolia the previous remarks regarding fevers in summer and autumn apply. (See Meteorological tables, Appendix III.)

**WINDS AND WEATHER.—In the Dardanelles** north and northeast Etesian winds (named Meltem by the Turks) prevail on an average nine months of the year, whereas the irregular westerly winds last scarcely three months, during which period it frequently happens that they are not felt in the archipelago, where it is generally a calm. The winds are most variable at the equinoxes, and generally any change from north to south will take place at new or full moon.

**Northeast winds.**—In winter northeast winds often blow hard for several days if the wind should have set in from that quarter after a squall. These winds are often accompanied by fog and snow. Navigation then becomes impracticable in the Dardanelles for a sailing vessel.

In the summer north and northeast winds are more constant. They are clear, agreeable, and moderate, and the barometer stands high. They spring up generally in the morning, die away with the setting of the sun, and are followed by light offshore breezes, chiefly in the deep bays. The regular but gentle sea and land breeze is called the Imbat, and prevails all through the archipelago for a considerable time. It lasts sometimes so long that it is not a rare occurrence to see a number of sailing vessels in Tenedos Channel or in the other anchorages waiting a favorable and enduring breeze. With every slight southerly air they get under way, but only to shift from one anchorage to another, and they reach the Sea of Marmara after having accomplished the distance by short stages.

When in the morning a luminous horizontal streak level with the land is seen in the eastern horizon (provided the streak is perfectly distinct and topped with gray clouds), a breeze of wind from the northeast may be expected, which will freshen during the day and die away at night.

At the equinoxes and in the winter, if the wind comes suddenly from the northwest or north with a squall and heavy banks of clouds, it will veer to northeast and blow hard for about three days. But generally the northeast wind does not blow hard for more than a day.

**Northwest winds** occur occasionally at all seasons, the barometer standing at about 29.85. During the summer these winds blow fresh and the weather is clear. In winter they are accompanied by heavy squalls.

When white clouds are seen rising from the coast of Europe it is a sure sign that the wind will be from the northwest; and if the clouds revolve in rising it will blow hard from that quarter. Heavy squalls will then sweep along the European shore, and if great care be not taken will cause serious damage to vessels under sail.

Thunderstorms sometimes occur. They come from all directions, but more generally from northwest, with violent rain and heavy gusts of wind from different quarters.

**Southwest winds** may occur in any month. In winter they are frequent, blow hard, and bring rain; the sky is loaded with clouds and the barometer usually stands at about 29.65 inches. It often happens that southwest winds, though very violent in the Mediterranean, hardly reach the archipelago, and fall calm at the entrance to the Dardanelles. Sometimes, however, they blow home to the strait, and there suddenly fly round to the northeast in a squall. Whenever a vessel approaches the Dardanelles with the wind from southwestward, however long it may have held, a good lookout should be kept for the least brightening of the horizon toward the Sea of Marmara, to prevent the vessel being taken aback by the sudden and dangerous shifts of winds. In autumn and in winter, after entering the strait with fresh southerly winds and clear weather, a vessel may almost be sure of finding the wind from the southeast in the Sea of Marmara.

In autumn the weather with southwest winds is clear. The wind veers to south in the Dardanelles and southeast in the Sea of Marmara; and they are in one respect favorable to navigation, as the land is then very distinct.

Whenever in the night in fine weather, with a clear sky, a heavy dew should fall the wind is almost sure to come round to the westward, and is sometimes the precursor of a violent west or southwest wind; but, although there is then a decided appearance of bad weather, the wind will generally in a few hours fall light, and, without reaching the Sea of Marmara, will subside in copious showers of rain.

During the period from March to September southwest and southeast winds are rarely experienced. At that time it is indispensable that vessels should take advantage of offshore winds, if it be only to shift from one anchorage to another. A light south wind will sometimes commence in the afternoon, veer to the north at midnight, and blow hard. The change will sometimes be preceded by rain, but more frequently by a calm, clear night with a heavy dew.

**Sea of Marmara.**—What has been said of the winds, as well as almost all the observations on the weather, when describing the Dardanelles, are applicable to the Sea of Marmara; thus north and northeast winds are prevalent in this sea almost all the year. In the summer they are clear and moderate and die away at sunset. In winter they are sometimes violent and raise a short cross sea, which obliges sailing vessels to seek shelter among the islands to the southward, or at Gallipoli, if they have not passed Marmara Island.

A British naval officer states that the weather varies much in different years in the Sea of Marmara. Winter, with its gales and occasional fine days, lasts till the end of March. In some winters southwesterly gales will prevail, with scarcely one from the northeastward. In others (the more usual case) it is the contrary, and the winter is consequently more severe. Spring is very short; leaves and vegetation appear rapidly, and summer arrives in May.

The meltem, or summer northeasterly breeze, is not regular in its appearance, and until it does come to relieve the air there are many hot, close days. It generally begins in the latter part of June, and should last until September. On those days when it prevails the temperature is pleasant, but in early mornings up to 10 o'clock, before it sets in, and on days when it is superseded by the warm southwest wind, it is oppressively hot. This wind will be very different in different parts of the sea. Generally speaking, the meltem is much more regular in the northeastern part than in the west and south, and sometimes even a fresh breeze will not absolutely fetch the southern shores of the Marmara, while a few miles off it will be blowing fresh.

Along the European shore the meltem draws much along the land. Thus at Eregli it is nearly east and in Rodosto Bay east-southeast, while a few miles outside it is about northeast. South and southwesterly winds will prevail about the Marmara Islands when the meltem is blowing farther eastward. During these months rain is rare. In all cases in the summer the meltem causes a haze; whereas southerly winds make the atmosphere very clear. April and May are the clearest months.

In autumn and the beginning of spring south and southeast winds are frequent, especially along the northern shore; they are often fresh but always clear, and they render the land very distinct.

In September the weather is very fine, a continuation of summer—cloudless skies day after day, with perhaps a rain and thunderstorm or two only.

In early October the winds get more to the north and northwest and there is a heavy thunderstorm or so and a drop in temperature; uncertain weather to the middle of the month, when a fine calm spell follows for about a week, when a well-defined and almost regular period is entered upon—heavy north or northwesterly winds or gales accompanied by rain for several days (the moment of the passage of the big migration of birds from Europe into Asia), generally followed towards the end of October by three or four days of fierce southerly winds or gales.

November almost always comes in fine, with a cold snap for a few days only in the second or third week and a return to calm, warm weather. A heavy south wind, lasting from three to seven days, usually closes November and opens December, followed by a lovely spell of fine, calm, warm weather until about Christmas, when the weather varies greatly, the real bad winter weather coming on about mid-January.

**Thunderstorms** are most prevalent in May, June, and July, but their continuance or frequency much depends on whether the Meltem or northeasterly wind sets in regularly or not, and on whether southwesterly winds in the archipelago cause a conflict of currents of air, which result in these phenomena. They gather quickly and bring furious blasts with them.

**Gales.**—During winter the barometer generally rises during northwest gales, sometimes as high as 30.58, and turns just before the gale slackens; at others a heavy northeasterly gale will blow for two or three days, with a constantly falling barometer. This instrument can not therefore be said to be a sure guide for these winds, but a low barometer is an invariable indication of southwest winds, although they may not actually fetch into but may only blow hard in the archipelago and send their rain alone eastward to the Dardanelles.

As this probably depends on the strength of the northeast winds blowing at the time in the Black Sea, it is impossible to judge in the Sea of Marmara whether the southwest wind will force its way in or not. The safest plan is to assume that it will, and with a threatening appearance of the sky and a low barometer be prepared. When southeast gales do occur they are heavy and squally, but generally last a comparatively short time and veer through west to northeast, from which quarter they will again blow for a couple of days.

**The Bosporus.**—In the Bosporus the usual winds are those from north to northeast and south to southwest. Northeast winds are the most frequent. Northwest and southeast winds are but seldom felt.

The wind is generally variable at the time of the equinoxes, but during the summer months, from the beginning of May to the middle of September, the Meltem blows very steadily from north and northeast and brings fine weather. These winds spring up early in the forenoon, increase in strength until 3 or 4 p. m., and fall with the sun, calm prevailing through the night.

During the other months of the year the winds are variable in the southwest quarter, except about full and change of the moon, when they sometimes veer to the northeast. Southwest winds when strong are generally accompanied with rain, but with fine weather when they are light; in the winter they bring fogs.

In summer the winds never blow across the Bosporus, although that may sometimes happen at either of its entrances. Thus in the morning light southeasterly breezes occasionally come in from the Sea of Marmara, and light northwesterly winds in its northern reach, especially about Buyukdere Bay. In the intermediate space, if there be land breezes they are very light and do not reach mid-channel.

During the day sometimes a smart gale springs up from the eastward, but it never lasts after sunset.

Northerly winds with fine weather freshen in proportion to the heat of the sun.

In summer it sometimes happens that the wind is from the southwestward in the southern and from northeastward in the northern parts of the channel, leaving it calm between Arnaut Point and Selvi Burnu; and it is not of rare occurrence to see vessels going different ways, both with a fair wind. In these cases, if the breeze is fresh from the northeast it will be certain to prevail, and the vessel coming from the southward should immediately make for an anchorage unless prepared to work to windward. At other times southwesterly winds blow strong at Buyukdere and in the upper part of the Bosporus, while they are hardly felt at Constantinople or they do not reach it till some hours later. When this takes place the wind is sure to be from the southeastward in the Black Sea and favorable for vessels bound to Odessa or the Sea of Azov.

In winter southwest winds are frequent. When they blow hard, with an overcast sky, and the barometer is down to about 29.59, they are generally accompanied with rain and last several days. As they moderate the temperature becomes milder and the weather fine, which is in fact its usual feature during this season. Bad weather generally comes on after sunrise, and rarely lasts beyond sunset; if it should last all night a gale of wind may be expected. In this season sudden shifts of wind are frequent and dangerous.

If a light southerly wind commences to blow in the afternoon immediate advantage should be taken of it, as in that case the wind generally veers round to the northward at midnight and blows hard.

In winter strong winds from the northeastward are always accompanied with rain, which generally clear away as they moderate.

**Snow** sometimes falls in February and at the beginning of March, when the wind is light from the northward, with hazy weather.

**Black Sea.**—The observation of several navigators establish approximately a line of demarcation from Cape Aiya, in the Krimea, to Kerempe Burnu, in Anatolia, thus dividing this sea into two parts, the western and the eastern. It is rare to pass this line without observing a change, and sailing vessels that come up to it with a fair wind are often obliged suddenly to brace their yards sharp up. There is a second division established by the direction of the winds, which divides the northern from the southern part of the Black Sea. This line, more vaguely marked, varies in the western basin from Cape Caliacra to the mouths of the Danube; and in the eastern basin, on the Caucasian coast, from Subeshikh to Cape Idokopas, near Pshad. It will be obvious that these two lines of demarcation are much less observable in the open sea than they are near the shores.

On the west shore the two most dangerous winds that blow are from the south and southeast. They are uncommonly violent during the equinox, and are the chief cause of the havoc committed in the Black Sea. The three great rivers—the Bug, Dniester, and Danube—also bring large masses of water to the sea from opposite points of the compass, and if a south or southeast wind is blowing produce the so-called "hacking" waves.

These dangerous winds do not frequently occur in the summer, for a northerly wind blows almost without intermission at that season.

Southwest winds are strongest in spring and autumn and are dangerous on the Caucasian coasts.

A northeasterly wind brings with it clear weather and cold in winter. Northwesterly and westerly winds, on the contrary, are often accompanied by fog and moist weather. Toward the middle of summer the northerly wind is generally steady, and although at a later period it gives place to a southerly wind, it often reappears in January and March and during all the spring. These remarks relate principally to the western portion of the Black Sea, which is subject to the influence of the Carpathian Mountains and the Balkan chain.

At Constantsa it was noticed that from May to August the land and sea breezes were fairly regular, the sea breeze, from between northeast and southeast, coming in about 9 a. m. and lasting till sunset, the land breeze, from between northwest and southwest, springing up about 3 a. m. and dying away about 8 a. m.

Occasionally during this period a strong northeast breeze was experienced, and at times strong westerly breezes accompanied by rain, lightening, and thunder. A dull, humid atmosphere gave notice of these thunderstorms.

In winter gales which blow from north-northeast to east generally commence more westward; a heavy swell, however, assures the mariner that the wind will shift.

On the north shore, in the spring and summer, the winds blow from northeast and southwest, sometimes strong. In the autumn they are more variable. High winds cause a confused sea in Kherson Bay, but the effect in the River Bug is but slight. On the southern coast of the Krimea south or southeast winds seldom blow home; but there are exceptions to these general rules, and they are the more remarkable as they are invariably violent. Southerly gales are said to moderate after veering to the westward and northward.

In the neighborhood of Yalta it sometimes blows very hard from the northwestward, and at Lampat the southwest wind often blows with violence through an opening formed by the Ayú Dagh and the other mountains.

In the eastern portion of the Black Sea the influence of the lofty range of the Caucasus and of Asia Minor is felt, and it is a remarkable fact that the prevalent winds in winter on this coast from Anápa to Subeshikh are those from the northwest, and from Subeshikh to Mingrelia from the southeast, although Subeshikh forms no very prominent point on the coast. The northeast wind, by the violence with which it blows from the tops of the mountains, is said to come from "The Bed of Boreas," a term given by the ancient Greeks and which applies at the present day. The winds from off the Anatolian shore are also in many parts the strongest that blow there.

At Novorossisk, on the northeastern shore of the Black Sea, the northeast winds, which are prevalent from the month of September to the beginning of April, sometimes blow with the strength of a hurricane, rushing down from the Varada Mountains with violence and causing such a sea that has driven many vessels on shore. These gales are preceded by clear weather and by small, white, flaky clouds above the mountains.

It has been observed on the coast of Caucasus that west or southwesterly winds seldom blow home. Land winds from east and northeast prevail at night and sometimes are fresh. Strong sea breezes generally haul round to the northward about sunset and lose their strength.

The coast of Anatolia or Asia Minor is rarely exposed to the violence of northerly winds; when they do occur they seldom blow home, being deflected towards east or west by the lofty range of mountains which extend in that direction throughout the country. Westerly winds are the most dangerous on the eastern part of this coast, but north and northeast winds do not reach it, and easterly storms also are always light, and the climate generally mild. The western part as far as the Bosporus, on the contrary, is cold and chilly, and the winds from west to north and northeast are accompanied by storms of hurricane force, which occasion shipwrecks and loss of life. Kerempe Burnu deserves the name of Spartivento (Separator of Winds), which has been given by the Italians to several capes in the Mediterranean; for a strife between the winds is often observed abreast of it.

During the month of May the western part of the Anatolian coast is sometimes visited with a gale from the north-northeastward, which on one occasion caused the wreck of several sailing vessels, but during the months of June, July, August, and September it is said to be safe.

At the Black Sea entrance to the Bosporus, during the summer months, from the beginning of April to November, the prevalent wind is from the northeast, with a fine, clear atmosphere; southwest winds prevail during the remainder of the year, and blow sometimes with violence in the months of December and January, the northeast gales being more frequently experienced in the months of September, October, and November.

**Sea of Azov.**—In the Sea of Azov, with the exception of the Gulf of Taganrog, northeasterly winds prevail, especially in the winter. Commencing in March southerly, southwesterly, and westerly winds occur, which in the warm season during the daytime, especially in the southern part of the sea, are the prevailing winds. Southeasterly winds blow least frequently of all.

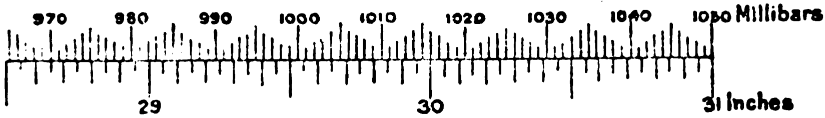
In Taganrog Gulf easterly winds prevail. In the summer westerly winds are more frequent, but in the mornings easterly winds predominate. In the coastal areas of the Sea of Azov there is also a noticeable change of wind during the 24 hours, but this change is not so marked in the Black Sea. Calms are more frequent in summer than in the remainder of the year. Calms are more frequent in the evening hours and are least frequent in the midday hours. Gales occur more often in the autumn and winter, the prevailing direction being from the eastward and northeastward. The winter gales are remarkable for their long duration.

**Weather bulletins** showing the state of the weather in the Black Sea and Sea of Azov are posted up daily at the principal ports.

**Barometer.**—It has been remarked that the barometer generally rises with north and northeasterly winds and falls with those from southwest. Thus with fine weather and northeast wind it varies from 29.94 to 30.15, while with rain and northeast wind it falls to 29.80, and with squally and stormy weather still lower; with southwest winds and rain it stands between 29.65 and 29.74, but is generally above 29.80 with light southwest winds and fine weather.

With strong northeasterly winds during winter the barometer is frequently up to 30.50 and even 30.58, and will be at 30.42 for days together; and throughout the year it often rises to 30.24. See also Meteorological tables, Appendix III.

The graduations of barometric scales in millibars having now been largely introduced, the accompanying diagram is inserted to enable the mariners to convert millibars into inches, and vice versa.



**WATER LEVEL, variation of.**—The depths shown on the charts of the Sea of Marmara, Black Sea, and Sea of Azov are the depths at the mean level of the water. Although not subject to tidal influence, the level of the water is subject to variations caused by barometric height and by wind.

The level of the water in the Dardanelles rises sometimes as much as 2 feet above the normal, and strong southerly winds will raise that of the Bosporus by a similar amount.

At Kilios, near the Black Sea entrance to Bosporus, the level of the water has been reported to vary from 3 to 5 feet.

The level of the Black and Azov Seas is subject to considerable fluctuations, which are quite definitely indicated by the regular gauge observations at the several places. A comparison of these results shows that the mean annual levels from year to year vary, and these variations are almost always in agreement with each other throughout the whole sea; that is, a rise or fall of level is observed at one and the same time at all the stations. The mean change of the annual levels is equal to 2.2 inches, but in individual years it may vary considerably from the mean; for example, from 1897 to 1898 there was observed a marked lowering, which was expressed by 4 to 7 inches at different stations, while from 1894 to 1895 there was a distinct rise, expressed by 5 to 6 inches. The greatest change of the sea level observed has been at Taganrog and the least at Sevastopol and Varna.

In addition to these changes the level of the two seas undergoes quite definite changes in the course of each year, reaching the maximum height in the summer (June) and the minimum height in November.

Usually from April to August, inclusive, the level of the sea is higher than the mean for the year, and from September to March lower. At almost all the ports the rise is most marked from April to May and the fall from August to September. The range of the annual movement (mean monthly), as deduced from many years' observations, is from 6 to 11 inches in the Black Sea and from 10 to 20 inches in the Sea of Azov.

In individual years the high and low levels may occur at considerably different times from the above means; thus, for example, the maximum will occur in May to July and the minimum in October to December. In general it may be said that the time of the maximum is remarkable for a greater constancy than that of the minimum. One of the causes of the clearly expressed annual movement of the height of the level is due in all probability to the fact that in the summer, owing to the increase of the inflow of the river waters, the mass of water increases, while in the winter it diminishes owing to the smaller inflow.

Considerably greater amplitudes than in the annual movement are given by the extreme fluctuations—the differences between absolute maximum and minimum—as is seen in the following table, where also the years are given for the period to which they refer:

| Place—Period | Variations of level | | Place—Period | Variations of level | |
|---|---|---|---|---|---|
| | *Ft.* | *In.* | | *Ft.* | *In* |
| Varna (1895–1914) | 3 | 7 | Cape Chauda (Theodosia) (1903–1911) | 2 | 9 |
| Dniester Estuary (1894–1913) | 3 | 4 | Kertch (1891–1911) | 2 | 11 |
| Odessa (1891–1911) | 4 | 7 | Poti (1891–1911) | 3 | 3 |
| Ochakov (1896–1911) | 4 | 2 | Batum (1891–1911) | 4 | 2 |
| Cape Tarkhankut (1891–1911) | 2 | 6 | Genichesk (1898–1911) | 8 | 4 |
| Sevastopol (1891–1911) | 2 | 2 | Taganrog (1891–1911) | 14 | 4 |

The range of the fluctuations of the level in the autumn and winter (November to January) is more considerable than in the summer (June, July. An exception is Taganrog, where the greatest fluctuation occurs in April and the least in February.

The height of the level is also affected by the wind. A wind from seaward raises the level, and vice versa. Generally off the Krimea the results of the action of the wind on the level are less than in other places in the Black Sea, and especially in the Sea of Azov.

In the Gulf of Taganrog strong northeasterly winds lower the level by 6 feet or more. In the undermentioned table are shown for different places the directions of winds producing the highest and lowest levels, and also the mean ranges in inches and the number of years for which these ranges were taken:

| Place | Number of years | Winds | | Range | Place | Number of years | Winds | | Range |
|---|---|---|---|---|---|---|---|---|---|
| | | On-shore | Off-shore | | | | On-shore | Off-shore | |
| | | | | *Inches* | | | | | *Inches* |
| Dniester | 1 | NE | SW | 8.9 | Cape Chauda (Theodosia). | 7 | SW | N | 2.1 |
| Odessa | 8 | SE | NW | 10.9 | Kertch | 8 | S | W | 2.2 |
| Ochakov | 7 | S | N | 7.9 | Poti | 8 | W | E | 5.5 |
| Cape Tarkhankut | 8 | S | NE | 4.2 | Genichesk | 8 | ENE | W | 12.0 |
| Sevastopol | 1 | W | E | 2.5 | Taganrog | 9 | W | E | 24.0 |

In addition to the direction of this wind, these ranges are affected by the velocity of the wind and also by barometric pressure, and are considerable in places, the undermentioned ranges having taken place within a few hours:

| | | | |
|---|---|---|---|
| Odessa | 12 inches. | Taganrog | 56 inches. |
| Poti | 11 inches. | Genichesk | 32 inches. |

which by no means represent the limit.

**CURRENTS.—General remarks.**—During the year 1872 an extensive series of observations were made by the British naval vessel *Shearwater* on the currents of the Dardanelles and Bosporus. The observations in the Dardanelles were comprised between June 14 and October 30, those on the Bosporus between August 17 to 26 and October 12 to 18. The following is a general statement of the results:

There is a general flow of the Black Sea water through the Bosporus, Sea of Marmara, and Dardanelles to the Mediterranean, probably caused by the combination of three elements; firstly, the prevalence of northeast winds in the Black Sea; secondly, the excess of water received from the large rivers over the amount lost by evaporation at some seasons; and thirdly, the difference of specific gravities in the two seas.

Of these the wind has by far the greatest influence, for it has been observed that the current in the Bosporus is generally stronger in the afternoon than in the forenoon, and as the mornings are usually calm and the northeast wind gains strength during the day, the increase in the strength of the current seems to be due to the wind.

There is in general a countercurrent setting under the surface stream in an opposite direction, namely, from the Mediterranean to the Black Sea; the undercurrent seems to be dependent on the surface current, for when the latter is slack the undercurrent is slack also.

The average rate of the surface current in the Bosporus is estimated at 2½ knots and in the Dardanelles 1½ knots.

**Dardanelles.**—In the Dardanelles the points projecting from the land have the effect of changing the course of the current by causing eddies, of which, in some parts of the strait, especially in the bays, advantage may be taken by a sailing vessel proceeding eastward with a light wind. In general along the coast of Europe, where the points are less prominent, there are few eddies; and on the coast of Asia, though favored by eddies in the bays, a vessel has to go through the whole strength of the current when rounding the points.

The strength of the current, which is variable, depends much upon the direction and force of the wind, and, as will be easily understood, upon the heavy rains and snows of winter, which swell the large rivers falling into the Black Sea. At that time, when it blows hard from the northward, the violence of the current increases, especially in the narrows, where it has been known to attain during the first few days a rate of 5 knots between the old castles of Chanaq Kalessi and Kilid Bahr. During strong southwest winds the current is sometimes reversed. But this is unusual, and as northeast winds prevail nine months of the year, the southwesterly current may be regarded as almost permanent. From Gallipoli to Kum Kale the average strength of the current may be estimated at 1½ knots for the whole distance. (See also p. 88.)

**Surface and undercurrents.**—Observations were made on the currents of the Dardanelles and Bosporus in September, 1884, by an Italian naval officer.

For the observations a well-tested current meter was used, by means of which both the direction and speed of the upper and under currents at various stations were obtained, with considerable accuracy, at distances of every 5 or 10 meters of depth from the surface to the bottom.

The following general conclusions have been arrived at as the result of those observations:

In the Dardanelles south of Chanaq.—In this channel the upper current does not extend to the same depth as in the Bosporus, and is not found below 5½ fathoms (10.1 m.), and the neutral zone maintained an even depth throughout this part of the channel.

There is a greater mass of water moved by the under current, but the speed of the current is less, its greatest speed being 1 knot.

**The Sea of Marmara** is so bounded by the coasts of Europe and Asia, and so connected with the Black Sea and the Aegean, that these two seas have an unceasing influence on its waters.

The Black Sea, lying in the direction of the northerly winds, which blow the greater part of the year, sends through the Bosporus its snows, fogs, and storms, and the excess of its water: while the archipelago exercises a more favorable influence, as its numerous elevated islands break the force of southwest winds and reduce the strength of the current. From the fact of these two opposing influences constantly working it is almost impossible to know what weather to expect in the Sea of Marmara from what has been experienced in passing through the Dardanelles or Bosporus; but a vessel going eastward can to a certain extent know whether she will find the currents regular and strong or not, according as to whether the winds in the Aegean have been assisting them by blowing from the northeast or checking them by prevailing from the opposite direction.

The currents in the Sea of Marmara are produced by the excess of water that the Black Sea almost constantly pours into it by the Bosporus; their general direction is, therefore, westward toward Gallipoli, but with a few slight variations, owing to its islands and to the sinuosities of its coasts.

A continuance of strong southwest winds will, however, check the currents in the Bosporus and Dardanelles, and even occasionally reverse them. At these times everything is disorganized, and the currents in the Sea of Marmara may run in any direction.

As a rule the current from the Bosporus on entering the Sea of Marmara spreads out in the shape of a fan, the left branch setting toward Princes Islands and through their channels, and thence toward the Gulf of Izmid, round which it runs from west to east along the south coast and from east to west along the north coast. Between this current and the coast of Asia, from Skutari Point to Tuzla, there is a zone of back or counter current which sets toward the Bosporus, and inside this again is a narrow strip of southerly current setting close to the shore past Bostanji as far as Maltepe Burnu.

The central branch takes a southerly direction toward Boz Burnu, turns eastward along the south coast of the Gulf of Mudania, and then again westward along its north coast, setting out very strong to the westward abreast Armudli village and past Boz Burnu. Lastly, the right branch takes a southwest direction, but leaving between Seraglio and San Stefano Points a space where the current is generally weak, and even sometimes forms an easterly eddy or countercurrent.

In the channel northward of Marmara Island the current generally sets west by south or west-southwest, and, according to observations, its strength is much increased in the vicinity of Hora. Here the current runs entirely along the European shore and in the center, the Asiatic side being protected by the Marmara Islands. Its maximum rate at Hora is 1 knot. Many vessels have been wrecked on this shore between Heraklitsa and Gallipoli, owing to the current having a tendency toward the coast, and to haze, which, hanging over the lower land fronting the high land at the back, gives the impression that vessels are farther offshore. Very few vessels have been wrecked on the Asiatic coasts.

In the lesser channel to the southward of Marmara Island the current sets about west by north; but also pouring through Rodia and Arablar Channels between the islands to the southward, and then eastward along the north shore of the great bay of Artaki, round which it sweeps before resuming its westerly course along the south shore toward Gallipoli Strait.

The different directions which have been thus ascribed to the Marmara currents must not be taken as absolute on all occasions, but they will be found correct in ordinary weather. It has been said that an easterly eddy is to be found along the north shore of this sea. Such indeed may be perceived off San Stefano Point when the stream through the Bosporus first meets the southwest wind and swell, but no countercurrent or eddy will be found westward of that point. The general currents, however, are much weakened and sometimes altogether checked when the wind has been blowing a long time from the southwestward.

In the Sea of Marmara it is difficult to ascertain the general rate of the current, as it is governed by so many causes. The stream from the Bosporus very quickly loses its strength on entering the Sea of Marmara, but it always increases with a gale from the north and northeast, as well as during the heavy rains in winter, when the Black Sea sends into it a mass of water much larger than usual. The thaws in April, May, and June, combined with northeast winds, which are prevalent in that season, tend also to increase the strength of the current. This strength diminishes when violent southwest winds prevail; the currents are also generally weaker in calm weather, and their average strength in the main channel must not be estimated at more than 1 knot with a fresh breeze from the northeast, 1½ knots with a strong gale from that quarter, and ½ knot in calm weather. In a gale from the northeast it has been found to set west by south 1 knot at about 8 miles southward of Eregli Peninsula.

**The Bosporus.**—In whatever direction the wind may be, the current almost invariably sets from the Black Sea to the Sea of Marmara, it being fed by the superabundance of water poured into the Black Sea in winter by the great rivers and in the spring by the thawing of the snow. Its general direction is that of the channel, but the numerous windings produce a variety of countercurrents and whirling eddies under the points.

The axis of the current is generally in the middle of the strait, and its edges are almost always defined by straight lines from point to point on the same shore, with the exception of Kiobashi Point, round which it curves outside the bank. Between these lines and the shore, especially in the bays and behind the points, it always leaves an eddy, which increases in strength according to the rapidity of the main current.

The strength of the current in the strait is nowhere uniform, and is influenced by so many different causes that only a general estimate can be given of it for the use of the navigator. The variations in the breadth of the Bosporus form one of those causes, but the great fluctuations in its rapidity and direction are partly due to the angular forms of the two shores, the disposition of their points and elbows being such that in some places, as at Kanlija and Kandilli, the waters are occasionally driven from them toward the opposite coast with such violence that their first direction is almost reversed.

Again, the winds and the seasons are some of the principal causes which modify the current in the Bosporus; and the period when the snow thaws, which is about the time when north and northeast winds prevail, may be supposed to bring on the maximum of its rapidity. This generally happens between the latter part of June to the end of August, when it sometimes attains the rate of 5 or 6 knots in certain parts of the channel, and is impossible to stem in a sailing vessel, unless with a fair wind. This strength decreases with southerly winds, and when the principal causes just named cease to act it becomes very weak.

In the autumn it has been observed that fresh southerly winds in the Bosporus will in a few hours arrest the southerly current and cause it to flow to the northward with a velocity depending on the strength of the wind, and which sometimes reaches 2 or 3 knots. This current occasionally continues for a day after the southerly wind has ceased, changing all the well-known eddies and thereby necessitating most careful navigation.

Southerly winds, which are violent and lasting in the archipelago, and are more or less felt in the Sea of Marmara, have the effect of decreasing the action of the current both in the Dardanelles and the Bosporus, especially if they blow after a gale from the northeast, which has left the level of the Black Sea very low at the entrance to the Bosporus. By keeping back the water of the Black Sea a strong southerly gale raises the level of the Bosporus, which rising, although amounting to 2 feet, is rarely enough to destroy the difference of level between Marmara and the Black Seas, the first and absolute cause of the constant direction of the current to the southward.

If immediately following this rise or if after a south gale the winds shift suddenly to the north and blow hard, the waters of the

Black Sea are sent with such force into the Bosporus that they break with impetuosity on the advanced point of Kiobashi, causing a strong countercurrent, which very often extends halfway across the strait.

At such time, except during the depth of winter, when both wind and current are very violent, a smart sailing vessel, if advanced as far as Kanlija and well handled, by making short boards in the eddies and countercurrents, might easily beat up to Kiobashi Point. From thence she may cross to the coast of Asia, work up along Beikos Bay, and then eastward of Englishman Banks, by which process she would no doubt reach Buyukdere Bay.

In the approach to the Bosporus from the Black Sea the ordinary rate of the current is about 2 knots, but this rate increases as it proceeds through the strait, attaining its greatest strength off Anadolu Hissar. Generally the current increases in speed during the day as the northeast breeze gains in strength, decreasing after sunset.

From the Black Sea the current runs in a southwesterly dirction and parallel to the European coast to Kirich Burnu, passing over Englishman Banks. At Kavak Point the channel is contracted and the current attains an increased velocity. There is a weak countercurrent in the bay between Kavak Point and Majar Kalessi, and a somewhat stronger countercurrent exists in Buyukdere Bay, but the current is scarcely perceptible in Umur Bay.

At Kirich Burnu the main current is deflected, and taking a southeasterly direction sets towards Pasha-bagche, thence along the Asiatic coast to Kanlija; it there turns towards the European coast, runs along Rumeli Hissar, and strikes on Kandilli Point. In Beikos Bay there is a strong countercurrent, which produces rips on Injir Reef; south of Yeniköi a countercurrent is formed off Stenia Bay, and off Anadolu Hissar and abreast Kiorfez there is sometimes a weak countercurrent close inshore. Abreast Bebek a countercurrent is always experienced.

The main current, running at the rate of 5 knots between Rumeli Point and Anadolu Hissar, strikes the western shore at Arnaut Point, abreast of which it attains its maximum velocity, and is named the Devil's Current. From Arnaut Point the main current sets towards the Asiatic coast, along which it runs as far as Leander Tower. A countercurrent which is frequently strong is formed in Kuruchesme Bay.

The main current, passing Leander Tower, sets strongly onto Old Seraglio Point and divides into two branches; the southern and larger flows into the Sea of Marmara and the western into the Golden Horn, in which it is lost frequently before reaching the first bridge, but it causes a countercurrent to form along Galata and

Topkane, leaving behind it a zone of eddies which may vary every six hours.

The countercurrent along this coast sometimes disappears and at other times continues along the coast as far as Defterdar Burnu, where it again turns and mixes with the main current down the Bosporus. In general the countercurrent off Galata begins about 9 to 10 a. m. and lessens late in the evening.

**Surface and undercurrents.**—Observations were made on the currents of the Dardanelles and Bosporus in September, 1884, by an Italian naval officer.

For the observations a well-tested current meter was used, by means of which both the direction and speed of the upper and under currents at various stations were obtained, with considerable accuracy, at distances of every 5 or 10 meters of depth from the surface to the bottom.

The following general conclusions have been arrived at as the result of those observations in the Bosporus:

The greatest speed of the upper current is at the surface or near it, while the under current attains its greatest speed at a depth about halfway between the neutral stratum and the bottom.

The rate of the upper current was found to increase as it flowed through the strait, being 0.6 knot at the entrance from the Black Sea, 2.1 knots halfway through the strait off Kanlija, and 3.2 knots south of Seraglio Point. The under current, on the other hand, increases in strength as the Black Sea is approached, its greatest rate being 0.8 knot off Seraglio Point and 1.6 knots off Kanlija and at the entrance to the Black Sea.

The dividing line or neutral zone between the two currents extends for only about 2¾ fathoms (5 m.) and increases in depth as the Black Sea is approached, being met with at a depth of 6½ fathoms (11.9 m.) off Seraglio Point and at 22 fathoms (40.2 m.) at the northern entrance.

From observations made at a station off Kanlija the volume of the surface current flowing from the Black Sea was calculated to be rather more than double that which flowed in the opposite direction, or approximately as 5 to 2.

**The Black Sea.**—By far the greatest quantity of water is received into this sea at its northwestern corner, where the rivers Dnieper, Bug, Dniester, and Danube empty into it. Most of the countries through which these rivers run are covered for three or four months of the year with snow, and in springtime all the moisture which has descended on them during the winter and has been preserved in a solid state suddenly dissolves and descends through the channels of the rivers with great velocity, producing a current running to the southward.

There is also an almost constant current from the Sea of Azov, the natural outpour from the Don and other rivers. It acquires its greatest strength in spring and autumn, and with a strong east-northeast wind blowing it is said to have attained a rate of 5 knots in the narrows of Kertch Strait; it runs, however, fairly through, and the rate is usually from 2 to 3 knots.

The current which sets out of Kertch Strait takes a southwesterly direction along the coast of the Krimea. Westward of Cape Khersonese it spreads out in different directions; that to the northward, toward Eupatoria and Cape Tarkhankut, bends to the westward and meets the waters of the Dnieper, the Bug, and the Dniester, which turn it away to the southward; a vessel when between the western extremity of the Tendra Peninsula and Cape Fontan, but more particularly near the latter, will feel the influence of this current, which, uniting with the water which flows out of the Danube, forms a current of about 1 knot toward the Bosporus.

The accumulation of the waters toward this strait, especially with strong northerly winds, is so great that it is not able to carry off all of it, and a portion is pressed against the cost of Anatolia, where it gives rise to another current running to the eastward and which makes its way along the cost of Asia and mingles with the waters of the Sakaria, the Kizil, the Yeshil, and the Chorokh, which carry it on to the eastward between Anatolia and the Caucasus, where it meets with the Rion, the Kodor, and other rivers, which add considerably to its strength. It then follows in a northwesterly direction the Caucasian shore, receiving all the waters from the mountains and the Kuban River, as far as Kertch Strait, where it completes, but only to commence anew, that circular movement which has been described.

Off the southern part of the Caucasian coast, between Poti and Batum, a strong set on-shore has been experienced after a fresh westerly wind.

Between Cape Khersonese and Kertch the strength of the southwesterly current setting along the coast of the Krimea will depend greatly on the state of the rivers flowing into the Sea of Azov and the direction of the wind, as in spring and autumn, and with strong northeast winds the volume of water running out of Kertch Strait is much greater, thereby increasing the velocity of this current.

The westerly current, which sets along the Caucasian shore, increases in strength as it passes the mouth of the Kuban, and meeting the current from the Sea of Azov westward of Tuzla Bank and the sunken breakwater, causes a considerable deposit of silt. Thence the combined currents take a direction southwestward parallel to the coast to Cape Takil, thence westward along the coast of the Krimea.

On the Caucasian shore the coast current running to the northwest is much felt in the locality of Cape Kadosh. On the Anatolian coast, near Sinub, the effects of a current running westerly as far as Kerempe Burnu have been experienced extending only a short distance from the shore, but at a greater distance to seaward it sets to the eastward.

The different directions which have been thus described to the Black Sea currents must not be taken as absolute on all occasions, as they are sometimes influenced by the winds or by local circumstances. There are countercurrents or eddies in the bay on the coasts of Rumelia and Bulgaria, and also at a little distance from the coasts of Anatolia.

Also the captain of a vessel remarks, on a passage from Burgas to Constantinople, "that with a moderate gale from north-northeast, an unmistakable set onto the coast and to the southward was experienced, amounting at first to only ½ knot, but getting stronger as the wind increased, and was such as might have caused the loss of vessels had the coast lights not been seen. On the passage from Burgas to Constantinople, with calms and light southerly winds, no current was experienced, which appears to point to the fact that the currents are greatly influenced by the prevailing wind." Another navigator, while corroborating the above remarks, states that if southeast and southerly winds have been blowing for three or four days a set of about ½ knot will be observed in a contrary direction.

With the exception of the indraft to the Bosporus the currents in the vicinity of the entrance are variable, being influenced by the prevailing wind, though as a rule they set to the eastward along the coast of Anatolia at the rate of from ½ to 1 knot.

**Sea of Azov.**—In the Sea of Azov there is little current, for even with a strong northeasterly wind it does not run more than 1 knot, and if a southerly wind should follow after a calm it flows for a short time in a contrary direction.

Its general course from the Don River is to the westward toward Byelosaraiskaya Spit, where it divides, the larger current taking a southerly direction for Kertch Strait; the other, following the northern shore, meets between Obitochnaya and Biriyuchi Spits, the water flowing through Genichesk Strait from the Sivash. This junction determines their course to the southward, along the Tonka or western shore toward Kertch Strait.

**FOGS—In the Bosporus** during the months of October to February, inclusive, and in the beginning of March fogs, with calms and light winds from the northeastward, are experienced, but they clear off at sunrise. Fogs sometimes come on with light southwesterly winds during the period mentioned, but clear away in the afternoon.

From the middle of April to the middle of May the fogs, then most prevalent in the Black Sea, generally enter the Bosporus during the night and morning, filling the channel and rendering it unnavigable. They more particularly cling to the coast of Europe, and seldom clear off till the sun is near the meridian. If they should hang in spots, especially toward the Sea of Marmara, southwesterly winds may be expected. These fogs are said to be unhealthy.

If the weather be fine in the Bosporus and the Black Sea entrance at the same time be hidden by a fog bank a shift of wind to the northeast may be expected. In winter sudden shifts of wind are, as before remarked, frequent and dangerous, especially if, as often happens, they come on at the same time as a thick fog; a vessel then caught aback in the middle of the channel would be in a very awkward position. A good lookout should therefore always be kept when near the entrance of the Black Sea, and no sailing vessel should delay anchoring when these warning signs are observed.

**Black Sea.**—Fogs begin generally in October and only end in June. In the open part of the sea fogs most frequently occur in April and May. In the northern part, between Sevastopol and Odessa, the greater percentage is in May; nearer to Odessa the greatest percentage (up to 12 per cent of the days) occurs in the winter months, and the least in summer (in August 6 per cent). On the south coast of the Krimea fogs do not occur so often; the maximum is 3 per cent in May and nil in August.

From Sevastopol to Batum, the eastern part of the Black Sea, fogs are more frequent in the spring (5 to 6 per cent) and the least frequent in the summer (August).

Also on the Caucasus shore the great number occur in the spring (5 per cent). During the summer months fogs are very rare.

On the southern shore, from Batum to Sinub, the greatest percentage is in May (11 per cent). In the winter and autumn fogs are rare. From Sinub to the Bosporus the maximum occurs in April (12 per cent) and the minimum in August and September.

On the western shore fogs prevail in spring from the Bosporus to the Danube; in May about 10 per cent and in August nearly nil.

From the Danube to Odessa the maximum fogs occur in spring off the Danube, while farther north the maximum passes to December (9 per cent); the minimum here occurs in August. It will be seen from the above remarks fogs are rarest along the Krimean and Caucasus shores. Spring fogs in the open sea usually occur in calm weather and are notable for their density, but are not lasting.

The most foggy localities are the entrance to the Bosporus and Kertch Strait (24 and 18 per cent). In those places fogs occur also in the summer, but almost exclusively at night or in the early morning.

The least number occur at Sevastopol, south coast of the Krimea, and the Caucasus coast. In the winter, with prolonged northeasterly winds, the shores, especially on the southwestern and western parts of the Black Sea, are covered with such a thick haze that it is difficult to distinguish the shore even when close to it, and this occurs with a clear sky.

**Sea of Azov.**—The season when fogs may be expected lasts from October to April in the northeastern part of the sea (Gulf of Taganrog), and until June in the western and southern parts.

In the western part fogs occur most frequently in the spring months, especially in March; in the southern part they are about equally frequent in December and in March, those in the latter month occurring more often at night and in the morning than later in the day; in the northeastern part of the maximum of foggy days is in the autumn (November), while in March there is only a slight increase as compared with January and February.

**White fogs.**—In the Black Sea these fogs come on at times with inconceivable rapidity during calm weather, enveloping everything with a thick white vapor through which nothing is visible. As the mist, however, occasionally rises to the top of the cliffs, and sometimes clears away altogether for a few moments, glimpses thus caught of the land, beacons, or whitewashed marks may give a knowledge of the vessel's position, obviating the necessity of vexatious delay on the part of the steamer and enabling a sailing vessel finding herself unexpectedly close to the shore to take all necessary precaution to avoid danger.

From July to September is the period during which the white fogs are most frequently experienced, though they occur occasionally during the other months.

In time of fog, however, and during bad weather, when dense clouds hang about the hills in the background and the driving rain renders everything obscure, great caution is necessary on approaching the coast, as at those times there are some localities that bear a strange resemblance to the entrance of the Bosporus, and if the land can not be seen the lead must be resorted to, when, if proper care is taken and due regard paid to the soundings, a good knowledge of the vessel's position can be arrived at and the entrance steered for accordingly, when the fog signals from Rumeli and Anatoli will probably be heard. See also page 165.

**Rainfall.**—As regards the quantity of rainfall during the year, the shores of the Black Sea show much variety. See Meteorological tables, Appendix III, for such places as are given.

**Snow** falls on the northern shores of the Black Sea, from Odessa to Cape Tarkhankut, from November to March; on the south coast of the Krimea from the early part of December to the middle of March; at Novorossisk and in the Sea of Azov from November to the middle of March, while on the northern shores of the Sea of Azov it falls sometimes even in September and in the middle of April. On the Caucasus and Anatolian coasts snow falls from the middle or second part of December to early March, but has been observed in the first half of November to the first of April.

**ICE.—General remarks.**—Shipping in the Black Sea has difficulties on account of the ice in three districts only; these are the Sea of Azov, the Russian harbors northwest of the Krimea, and the Danube River.

The most severe conditions as regards ice occur in the Sea of Azov, where the duration of the ice lasts for three or four months and the ice attains a thickness of about 2½ feet.

In Taganrog Gulf shallow banks, miles broad, particularly favor the formation of ice, and in the five winters of 1907 to 1911 Taganrog became completely inaccessible for more than four and one-half months.

Mariupol also is wont to be closed for two or three months, though the large ice breakers try to keep a fairway.

Of the other ports in the Sea of Azov there is little information, although at Yeisk it must be the same, as the channel is too shallow for the large ice breakers. In Berdyansk and the western ports navigation seems to cease very soon after the winter sets in.

In the northwest corner of the Black Sea the duration of the ice is about two months, the thickness not more than 1½ feet. At Odessa navigation only ceases in exceptionally severe winters, and then only for a few days. Near the south coast of the Krimea the ice and "salo" (thin or pancake ice) appears in severe winters only in the shallow bays and presents no obstacles to navigation.

The Russian harbors northwest of the Krimea, Kherson and Nikolaev, as well as Odessa, were almost always kept so far open by ice breakers that navigation, though with great difficulty, remained possible.

The ice breakers from the Sea of Azov, as soon as navigation is not possible, came to the assistance of the ice breakers in the Black Sea, and their united forces usually succeeded, even in the most difficult circumstances, in bringing vessels in or out of Kherson or Nikolaev, although according to reports vessels were frequently damaged by the ice or detained for many days.

At Odessa, although the vessels at that port are often icebound, they very rarely are damaged by the ice.

On the Danube River navigation appears to be stopped as soon as drift ice sets in.

**River Danube.**—The following statistics of ice in the Danube are taken from 51 years' observations, from 1837 to 1887, inclusive:

During that period the closings were as followings: In December 14, in January 19, and in February 8 times, the earliest recorded being December 7, 1862, and the latest February 23, 1881. The normal time of closing may be considered as occurring in the first 10 days of January.

The river remained open during 10 different winters.

The breaking up of the ice occurred as follows: In January 3, in February 19, and in March 19 times, the earliest being on January 18, 1866, and the latest March 30, 1875.

The greatest duration of ice was 96 days, in 1879–80, and the least, 13 days, occurring twice in the years 1871 and 1881. Mean of duration, 37 days.

Before closing the river usually "smokes" for a day or two; the frost then sets in hard and the river freezes at once.

In the year 1884 the first floating ice made its appearance at Ruschuk on December 2. As an instance of the quickness of transition from a state of floating ice to a complete block, it may here be mentioned that at noon on December 26, 1890, the river was reported by telegraph as being full of drift ice and an early closing of navigation anticipated, and only six hours later a further report stated that the river was completely blocked. The freezing is so sudden that vessels ascending the river after the first week in December run great risks of being detained two months or more.

At Sulina the river is only frozen in the severest winters, and is practically always open, but from January 13 to 20 and 22 to 28, 1889, a period of 15 days, the entrance was completely blocked by a belt of strong sea ice.

The following information for the five years 1907–1911 refers to both the closing and opening of navigation:

**1907.**—On the Danube River there was frost and a northerly gale on December 18.

On the river at Braila thin ice appeared, but steamers and lighters loaded there on December 23, and it was not until January 4 that strong drift ice appeared and the river was closed.

**1908.**—Frost was reported on November 15, and on December 30 the river was full of drift ice, navigation being closed finally on December 31. The river was reopened on March 31.

**1909.**—No difficulties due to ice were reported. The winter was exceptionally mild.

**1910.**—Owing to ice, the bar at Sulina could no longer be crossed on February 3. The river was opened to navigation again on March 7.

**1911.**—The river was frozen over at Galatz and Ismail on January 15 and 16, and on February 6 Sulina was ice covered. The navigation of the river was reopened on February 24.

**1921.**—The river was frozen over at Galatz on December 11. Navigation was not reopened until March 8.

The river froze over suddenly during a severe blizzard on the date mentioned above, when the temperature fell to 11° F. In previous years loose ice coming down the river had given sufficient notice of the river closing to enable vessels to get away in time, but on this occasion no less than 65 merchant vessels became iced in between Galatz and Braila.

The lowest temperatures occurred on December 11 to 14, January 8 to 12, and January 24 to 27, when minima of 11°, 16°, and 5° F. were respectively recorded. These coldest periods corresponded with periods of high barometric pressure and with winds from the northeast quadrant.

The ice within a fortnight of the setting in of the frost attained a thickness of 13¾ inches at Braila, whence it gradually decreased in thickness down river to Sulina, where it was 4 inches. It was not until January 5 that any of the beset vessels were released by the ice breakers.

**Dniester estuary.**—This estuary is covered almost every year with solid ice formed in it. Communication over the ice is established throughout the whole estuary and kept up usually to the second half of February. The ice attains a thickness of about 18 inches, but not infrequently in the winter the ice breaks up and the estuary is even entirely free of ice.

The observations over 20 years show that the ice appeared in November 9 times, December 9 times, in January twice, and cleared 1 times in February, 15 times in March, and once in April.

The Tzarigradskoe mouth does not freeze every year, but is covered with floating ice every time when the ice breaks up in the estuary and is carried out to sea. In some years the ice is driven back again to its mouth.

The sea outside is sometimes covered with floating ice as far as can be seen. Its duration, not counting the time it is being swept out of the estuary, is from a few days to one month.

**Odessa.**—In the harbors and in part of the roadstead ice forms on the spot. Between the appearance of ice and the freezing of the harbors two or three days, but not more than a week, passes. In the harbors the ice attains a thickness of about 18 inches, so that communication across it is established.

In the course of the winter the ice in the harbors sometimes breaks up, and they are even entirely clear of ice for some time, perhaps for two weeks.

The ice most frequently appears in December (of 15 winters it appeared 8 times in December and 7 times in January); it most frequently clears in March (of 14 winters it cleared 7 times in March, 5 times in February, and twice in January). The ice in the roadstead attains a thickness of 7 inches. It is covered with ice later than the harbors, sometimes by local ice but for the most part by driven ice; it is clear of ice earlier than the harbors.

The following information for the four years 1908–1911 relates to Odessa:

**1908.**—A very severe frost occurred at the New Year. On January 21 the sea was ice covered far out to sea, but the ice breakers managed to keep the channel open. On February 8 the harbor was ice-free through off-shore winds, but heavy ice drifting seaward made difficulties for shipping in the northwest portion of the Black Sea. On February 16 it had drifted so far towards the west Coast of Krimea that the mail and passenger service was stopped. On February 20 the fairway was reported clear.

**1909.**—No difficulties due to ice occurred. The winter was exceptionally mild.

**1910.**—On January 31 a hard frost and the formation of ice occurred, and in the middle of February 46 vessels were icebound in the harbor, the ice being 3 feet thick near the mouth of the harbor and extending for 100 miles towards the Bosporus. No such severe winter had been experienced since 1882, when the port was icebound for 36 days. It was not until April 27 that the summer marks were laid out and the harbor ice-free.

**1911.**—No difficulties were encountered until January 19, when steamers could no longer make fast to the quays. On January 22 a northwesterly wind setting in broke up the ice, and on the 27th traffic with the outer roadstead was conducted without the aid of an ice breaker. On February 17 ice was once more formed in the Bay of Odessa, but again a northwesterly wind setting in on the 28th reopened the roadstead.

**Odessa approach.**—In the open sea there is not ice every year. Here the ice is for the most part driven, and only occasionally settles in one spot. It sometimes covers the whole visible expanse, but does not hold for long, since it is soon dispersed by the winds. Over 14 winters the duration of ice at sea without interruption amounted to 10 days. In the course of the winter the ice occasionally appears several times.

**Kherson Bay.**—The ice is for the most part formed on the spot. Not infrequently the complete freezing of the estuary coincides with the appearance of ice; sometimes it freezes over a week later; it attains a thickness of about 18 inches. Communication is established over it between the places in the estuary.

In 22 years of observations the ice appeared in November 4 times, in December 12 times, in January 5 times, and in February once.

Out of 17 years' observations of its disappearance, it cleared in February 5 times, in March 11 times, and in April once.

Sometimes the ice breaks up, even clears, in midwinter and the ice is swept out to sea; the shore strip in some winters is covered with immovable ice as far as Odessa. There are cases of winters when there has been no ice in the open sea.

**Rivers Bug and Dnieper.**—The following information on ice in the Bug and Dnieper is for the years 1907–1911:

**1907.**—A thin covering of ice was first reported on December 24. On January 1 a few steamers were icebound near Nikolaev; the ice breakers failed to keep the channel open near Ochakov. Better prospects occurred on January 9, when a thaw set in, but nothing was reported of the results of the ice breakers; on the contrary, several steamers which attempted to leave on Febuary 7 suffered damage from the ice and had to turn back.

**1908.**—At Nikolaev and Kherson drift ice was reported on November 23, but serious difficulty did not occur until December 10. From Kherson the last steamer left on December 11, and with the help of ice breakers and east-northeast winds, which kept the channel open near Ochakov, got to sea on December 15. On January 16, owing to mild weather, the channel was kept open, but toward the end of the month ice breakers had great difficulty. Toward the end of February, owing to mild weather, the channel was open, but owing to the strongest ice breaker damaging her propeller on February 21, shipping was held up for a time.

**1909.**—At Nikolaev ice first formed in the beginning of January, but a thaw setting in at the end of the month the river was again almost ice-free.

**1910.**—On December 19 the ice was fairly thick in the Bug and Dnieper, but toward the end of December the rivers were ice-free again, owing to a thaw. Toward the middle of January thick ice formed, and considerable difficulty arose on January 30 in a heavy northerly storm; a few steamers managed to get to sea, but none arrived. On February 11 the mail and passenger steamers were discontinued, the strongest ice breakers being unable to keep the channel clear. Until February 24 a few steamers, despite the heavy ice, which was more than 3 feet thick in places, managed to put to sea, but no vessels arrived. In March the rivers were still partly closed, several steamers becoming fast in the ice; a thaw set in toward the end of the month.

**1911.**—The ice breakers began their work in the Bug and Dnieper Rivers on December 18. In January the channels were kept open with great difficulty by the ice breakers; from February 12 to 23, owing to the thickness of the ice, the channels were closed, and were opened again with great difficulty at the end of the month. On March 6 the channels were finally opened.

**Nikolaev.**—The ice forms on the spot. It sometimes breaks up in the winter, but in a short time the river is again covered with solid ice. Thus, for example, in the winter of 1898–99 the river on January 2 was clear of ice, and was only again covered with ice on February 26. The ice attains a thickness of about 18 inches.

Communication is maintained over the ice between Nikolaev and places on the opposite shore.

In 22 winters the first appearance of ice was noted 6 times in November, 13 times in December, and 3 times in January. It cleared most frequently in March (15 times out of 18), and less frequently (3 times out of 18) in February.

**Perekop Gulf.**—The ice first appears in Dzharilgatski Bay, on the northern side of the gulf; it attains a thickness of 10½ inches. The ice then appears in Karkinit Bay, and finally ice in the open sea (but not every year). Karkinit Bay in some winters is also covered with solid ice over the whole visible expanse for a short period. At Cape Tarkhankut, the southwest extremity of the gulf, drifting ice appears for a very short time.

**Krimea.**—At Chauda Lighthouse, eastward of Theodosia, in some winters "salo" (thin or pancake ice) and thin floating ice appears in the bay.

**Kertch Strait.**—The ice most frequently forms on the spot, but in the spring driven ice from the Sea of Azov sometimes appears. Between the appearance of ice and the freezing there is an interval of only a few days. In Kertch Bay the ice not infrequently breaks up several times during the winter and the bay is entirely free of ice; after a few days, and sometimes after two or three weeks, the bay freezes again. The ice on rare occasions attains a thickness of 14 inches. Communication is kept up over the ice in the winter with the quarantine station and with the fortress, and in exceptionally severe winters with Taman. The northern bight in Kertch Bay is the latest to be clear of ice.

Out of 21 winters the first ice was observed to form 11 times in December, 9 times in January, and once in February. In 20 winters it disappeared 3 times in January, 8 times in February, and 9 times in March.

**Sea of Azov.—At Genichesk,** on the western shoe, ice forms on the spot. Freezing begins from one week to one month later than the first appearance of ice, but the water is not completely frozen every year. Not infrequently in the winter the ice breaks up and floating ice is formed, while sometimes the ice is swept away for several days (up to a month) and the sea is entirely clear. The ice attains a thickness of nearly 2 feet. Communication from Genichesk with Biryuchi Island over the ice is often possible (13 out of 22 winters). Over a period of 20 years the first ice appeared 5 times in November, 11 times in December, and 4 times in January. Over a period of 22 years it disappeared once in February, 17 times in March, and 4 times in April.

**Berdyansk.**—The ice is most frequently drift ice, and the sea freezes from two to three weeks after the appearance of ice. In winters when only a partial freezing of the sea has been observed the remaining expanse of the sea is covered with floating ice. In some years in the middle of winter the ice breaks up and the sea is clear of ice for several days. In the spring, between the breaking up and the complete clearance of ice, there is an interval of from one to six weeks.

The ice attains a thickness of about 18 inches. Strong winds from seaward sometimes drive in masses of broken ice, which agglomerate and form bergs many feet in height. Communication over the ice is maintained in some winters with Mariupol, and almost every winter between the Berdyansk Spit and the town.

Over a period of 20 years the first ice was observed to form 3 times in November, 9 times in December, and 8 times in January. It cleared over a period of 19 years twice in February, 11 times in March, and 6 times in April.

**Taganrog Gulf.**—At Byelosari Lighthouse, north side of the entrance, drifts ice is the first to appear, and the sea freezes on an average 17 days after. During the winter the ice is sometimes partly broken up and the ice is driven a little distance offshore, but after a few days it is again covered with solid ice. Between the breaking up and the clearing of the sea there is an average interval of 24 days. The ice attains a thickness of nearly 30 inches. Usually at the end of December there is communication with Mariupol over the ice, which is maintained to the end of February or the beginning of March.

Observations over a period of 22 years show that the first ice appeared 6 times in November, 12 times in December, and 4 times in January; it cleared once in February, 13 times in March, and 8 times in April.

**Taganrog Roads.**—Between the appearance of ice and the freezing of the sea there is a period of three to four days. Between the breaking up and the final clearing of the ice there is a period of three to seven days. Sometimes a portion of the ice breaks up in December, but in a few days the sea is finally frozen. The ice attains a thickness of nearly 30 inches. Communication over the ice is usually maintained with the Don River, and in the end of January also with Yeisk (to the end of February). It is only in exceptional cases that there is no communication (1891–92). Over a period of 18 years the sea froze 9 times in November, 8 times in December, and once in January, and was finally clear of ice 10 times in March and 8 times in April.

The following additional information for five years (1907–1911) refers to the opening and closing of ports in the Sea of Azov:

**1907.**—The ice breakers started work on November 18. Taganrog was declared officially closed on November 21, and all steamers left Mariupol on November 23. A thaw set in at the beginning of December and the ice breakers succeeded in opening the channel; two steamers were damaged by the ice. On December 26 the port of Mariupol was officially closed.

**1908.**—Frost and snow set in as early as November 2, and Taganrog was closed on November 16. On the same day a vessel was icebound at Mariupol and three ice breakers endeavored to release her; on November 17 most of the steamers left Mariupol, one steamer being frozen in until the harbor was reopened. This took place on April 2, 1909. The ice breakers had previously broken through from Kertch, but the ice was still so heavy that a steamer which attempted to go out returned damaged by the ice.

**1909.**—Taganrog was declared closed on December 14, but whether this was due to the ice or not can not be ascertained. Mariupol was accessible up to January 8, and on Febraury 16 a steamer from Kertch managed to get close to Mariupol and was taken into harbor by the ice breakers the next day.

**1910.**—The port of Taganrog was closed on December 9. Mariupol was not closed until January 16. The ice breakers returned to Mariupol on March 23, and on the 29th they brought the first steamer into Mariupol. The first steamer to arrive without the aid of ice breakers entered the harbor on April 2.

**1911.**—Taganrog was closed on December 4. During December at Mariupol the ice breakers kept the port open with difficulty. They finally left Mariupol on January 18. The channel was reopened on March 14.

**Ice breakers.**—**Regulations** for vessels when being conducted through the ice by ice breakers:

1. Applications by vessels to be conducted through the ice must be made if in port to the harbor master, and if at sea to the captain of the ice breaker.

2. The harbor master, or should the ice breaker be outside the limits of the port the captain of the ice breaker, has the right to refuse an application to conduct a vessel to sea or to bring her into port if they consider that the vessel, as regards her construction, build, power of engine, equipment, or stowage of cargo, may be exposed to danger when in the ice.

3. The time and order of progression of vessels through the ice, as also the number of vessels to be conducted at one and the same time, will be determined by the captain of the ice breaker.

4. The captains of vessels following an ice breaker in the ice will be subject to the orders of the captain of the ice breaker as regards moving in the ice, and are to act in accordance with them.

5. Vessels following an ice breaker in the ice are to be guided by the signals mentioned below, which will be made by means of a steam whistle or siren or megaphone.

6. Vessels following an ice breaker must not overtake one another.

7. Vessels are to be ready at all times to reverse their engines.

8. Vessels following an ice breaker must be ready to take a towrope, and when in tow be ready to let go immediately; when in tow they are not to go ahead with their engines, but must be ready to go astern.

9. If a vessel sustains any damage she must hoist NC of the International Code.

10. Should the captain of a vessel to which assistance is being rendered fail to carry out the orders given by the ice breaker, the captain of the ice breaker has the right to refuse further assistance until his orders are obeyed.

11. The Ministry of Trade and Industry, in the person of its competent representative, is not responsible for damages which may be sustained by vessels when assisted by an ice breaker.

12. Any vessel making use of the services of an ice breaker for passing through the ice, by this very fact expresses assent to submit to all the stipulations of these regulations.

**Ice breakers—Signals.**—To be used when vessels are being conducted through ice:

| Number | Signals | Meaning of signals if given | |
|---|---|---|---|
| | | By the ice breaker | By following ships |
| I | One long blast | I am going ahead; follow me | I am going ahead; follow ice breaker. |
| II | One long and one short blast | Reduce your speed | I am reducing speed. |
| III | Seven short blasts | Attention! I am fast in the ice. | The same. |
| IV | Three short blasts | Go full speed astern | I am going full speed astern. |
| V | Two long blasts | Stop. Do not follow me | I am stopping. |
| VI | Long, short, and a long blast | Be ready to take towrope | I am ready to take towrope. |
| | | If the vessel is already in tow | |
| VII | Seven long blasts | Cast off towrope | The towrope is cast off. |
| | | Suspension of work until the morning or until more favorable conditions. | |
| | | If work has been suspended, "Stand by." | |
| VIII | A black cone | Signifies signal is meant only for the vessel nearest the ice breaker. | |
| IX | A black cylinder | Signifies that the sound or other signals are only meant for the ice breakers. | |

If, owing to the distance, the ice breaker does not hear Signal III made by a vessel, the latter will hoist a ball by day or a red light by night, which will remain in position until the ice breaker comes to her assistance.

Signal V should be made by all vessels stopped in the ice in a channel during fog or snowstorm, in addition to the usual fog signal bell.

When a vessel is too close to the ice breaker the latter will display astern a red flag by day and a red light by night.

# CHAPTER II

## THE DARDANELLES

**General description.**—See page 21.

**Aspect.**—A vessel from the southwestward, bound up the Dardanelles, will first identify the entrance by the white cliffs of Cape Helles, the southwestern point of the Gallipoli Peninsula, which forms the north point of the western entrance and on which stands a conspicuous white stone lighthouse. On the south side are the cliffs of Sigeum, terminating at the mouth of the strait with the hill of Yenishehr, also steep and cliffy. Another very conspicuous distinguishing mark on the European side is Achi Baba, or Tree Peak, 730 feet (222.5 m.) above the sea, at 5 miles northeastward of Cape Helles; it appears as an isolated conical peak.

On approaching nearer the small towns of Yenishehr and Seddul Bahr will be perceived on their respective sides of the strait; the former is built on the summit of the hill of the same name, 230 feet (70.1 m.) in height, and is now in ruins. The castle of Kum Kale will then be seen standing on a low point that stretches from the hill on Yenishehr to the north.

Seddul Bahr, also in ruins, is on the north side of the strait and stands on the slope of the hill forming Cape Greco, which is ¾ mile eastward of Cape Helles. Here are the conspicuous ruins of one of the old stone fortresses which gives its name to the town. When these two towns can be distinguished the entrance of the Dardanelles, 2 miles wide, will be plainly opened.

## FROM WESTERN ENTRANCE TO KILID BAHR AND CHANAQ KALESSI

**EUROPEAN SHORE—Cape Helles.**—The European shore of the Dardanelles is the ancient Chersonese of Thrace. It commences at Cape Helles (*40° 03′ N., 26° 11′ E.*), a high headland 1½ miles in breadth, projecting to the southwest and formed by three steep points of a white color. The westernmost, Cape Tekke, is the ancient Mastusium Promontory; on the second point, Cape Helles, stand some ruins and a tomb said to be that of Protesilas; and on the third, or Cape Greco, are the ruins of the castle of Seddul Bahr.

The headland, though steep, is fronted by a flat of rock and sand which extends seaward about 300 yards from Cape Tekke and Cape Helles.

**Cape Helles Light.**—A flashing white light, 164 feet (50.0 m.) above the sea, visible 19 miles, is exhibited near the extremity of Cape Helles. (See Light List.)

**Monument.**—A monument 70 feet (21.3 m.) high on the hill about 520 yards northeastward of the light is very prominent.

**The castle of Seddul Bahr,** in ruins, formerly a quadrangular enclosure with solid walls having low towers at the angles, stands on the side of the hill which slopes to Cape Greco, with its lower wall at the water's edge. On the height behind the castle there is a fort in ruins named Shahim Kalessi.

The small town of Seddul Bahr, now in ruins, stands on the hill eastward of the castle. There is a pratique office here for the use of coasters.

There is a stone pier below the castle which has 10 feet (3.0 m.) alongside its southern face, but caution is necessary when approaching it, as it is protected by a stone mole terminating in a sunken lighter.

**Signal station.**—A signal station for vessels entering the Dardanelles is located on the point 800 yards northeastward of Seddul Bahr Castle.

**Pilots.**—See paragraph "Pilot and tug service in Turkish waters," page 29.

**Radio.**—A radio station is located at Seddul Bahr signal station; call letters TAQ; range about 200 miles.

**Anchorage.**—There is a slight indentation of the coast between Cape Helles and Seddul Bahr which affords an indifferent anchorage. The best berth is found in 7 fathoms (12.8 m.), sand, with Cape Helles Light bearing 334°, about 650 yards. The 5-fathom (9.1 m.) curve lies about 300 yards from the shore line.

**Wrecks.**—The wrecks of three steamers lie sunk in this indentation between the two points.

**Morto Bay.**—About 1½ miles eastward of Seddul Bahr is another bold, steep, white point, named Eski Hissarlik, on which is the ruin of a battery.

Morto Bay, formed between Seddul Bahr and Eski Hissarlik, is about ½ mile in extent and has a low sandy shore, except near its eastern end; it is much encumbered by a rocky bank composed of sand and rock, which, curving round Seddul Bahr at a distance of 200 yards, extends eastward for about 1,600 yards, whence it turns at a right angle to the head of the bay; the eastern side of the bay is encumbered to a less extent. In the space between, about ¼ mile wide, there are depths of 12 to 17 fathoms (21.9 to 31.1 m.) affording indifferent anchorage. The current runs across the mouth of the bay at the rate of 2 to 3 knots.

About 650 yards inland from the head of the bay are five square pillars of an aqueduct.

**Anchorage.**—The bay may be found a convenient anchorage for steam vessels entering the strait before sunset, but there is very little swinging room in it. The anchorage recommended is in 14 fathoms (25.6 m.), with Eski Hissarlik bearing 88°, distant about ½ mile.

**Coast.**—From Eski Hissarlik to Kilid Bahr, a distance of 10 miles, the coast trends northeastward and is everywhere steep and barren, with a depth of 10 to 13 fathoms (18.3 to 23.8 m.) within a short distance of the shore; two small indentations afford anchorage in cases of necessity, but they are not recommended.

**Suandere** (*40° 06′ N., 26° 19′ E.*).—There is anchorage off this creek at a distance of 400 yards in about 10 fathoms (18.3 m.) partly in slack water if well in. A partially ruined pier at which boats can land is situated on the western side of the bay.

**Anchorages.**—There is anchorage off the small valley of Avuzlar, 2 miles southwestward of Kilid Bahr, but it is not recommended except in cases of necessity.

Vessels may also anchor ¾ mile southwestward of Kilid Bahr in 6 to 8 fathoms (11 to 14.6 m.). The two last-mentioned anchorages are easily recognized by the many vessels which are seen there, but it must be borne in mind that a vessel should not anchor more than 400 yards from the shore, for if further off she would be in from 25 to 30 fathoms (45.7 to 54.9 m.) water and in the main current.

**Water** may be easily obtained at these anchorages from the fountains on the coast, that to the northeastward of Avuzlar yielding a good supply of excellent quality; but if fresh provisions are required they must be brought from the town of Chanaq, distant 1½ to 2½ miles on the other side of the strait.

**Namazie Battery.**—On the point forming the northern side of the western entrance to the narrows is an open earthwork named Namazie; another battery is located 400 yards southwestward of it.

**Kilid Bahr Light.**—A flashing green light, 30 feet (9.1 m.) above the sea, visible 5 miles, is shown from a white iron column 17 feet (5.2 m.) high on the eastern angle of Namazie Battery. (See Light List.)

**Shoal.**—Depths of 2¾ fathoms (5 m.) are reported to exist between positions situated at distances of 200 yards 120° and 840 yards 208° from Kilid Bahr Light.

**Kilid Bahr.**—The castle of Kilid Bahr, or Old Castle of Europe, built by Mahomet the Second, stands on sloping ground on the edge of the strait just northward of Kilid Bahr Light.

There is a small boat dock with depths of from 4 to 5 feet (1.2 to 1.5 m.) close northward of the castle.

**ASIATIC SHORE—Cape Yenishehr** (*40° 00′ N., 26° 11′ E.*), the ancient Sigeum Promontory, at which the eastern or Asiatic shore of the Dardanelles commences, may readily be distinguished by a hill about 230 feet (70.1 m.) high on the summit of which is a large house. Northeast of the cape and a short distance inland are two conspicuous tumuli, which are said to be the tombs of Achilles and Patroclus.

**Yenishehr Bank.**—Cape Yenishehr springs from high lands, perpendicular on the side toward the sea, but terminates on the shore in a low point of land from which a wide bank with 1 to 3 fathoms (1.8 to 5.5 m.) water. The bank extends ½ mile from shore and follows the trend of the coast to the northeast as far as Kum Kale, where, and to the point northeastward of it, it extends 300 yards off. The bank has been reported to be extending. Its western part is somewhat dangerous, as it is not marked, and therefore should be given a wide berth.

**A patch** of 2½ fathoms (4.6 m.) lies close within the 5-fathom (9.1 m.) curve 1 mile 225° from Cape Yenishehr.

**Directions.**—Kum Kale, bearing 88°, leads northward of Yenishehr Bank. The bearing of Kum Kale Lighthouse is, however, sufficient for clearing the bank.

**Anchorage.**—Southward of the Yenishehr Bank there is an anchorage much used by tugs or vessels waiting for a fair wind. The best berth is in 12 fathoms (21.9 m.), with Cape Yenishehr bearing 33° and the hill over Demetrios Point 142°.

Kum Kale should be given a berth of at least ¼ mile.

**Coast.**—From Cape Yenishehr the coast trends northeastward about 1¼ miles, and then northward to a point on which is the castle of Asia or Kum Kale.

**Kum Kale Light.**—A flashing red light, 36 feet (11.0 m.) above the sea, visible 4 miles, is shown from a mast 29 feet (8.8 m.) high on a white house located at West Battery, south side of western entrance of the Dardanelles. (See Light List.)

**Mendere River** rises at the foot of Mount Ida, crosses the plain of Troy, and empties about 400 yards eastward of the castle of Kum Kale.

**Mendere Bank,** a continuation of the mud bank which lies offshore in the vicinity of Kum Kale, extends a distance of 1,400 yards from the shore eastward of Kum Kale and is steep-to.

**Kavanlik Liman.**—Vessels frequently anchor in Kavanlik Liman, the bight between Kum Kale and the most projecting portion of Mendere Bank, awaiting a fair wind; but caution is necessary, the edge of the bank being, as already remarked, steep-to. Navigators unacquainted with the locality should not anchor in less than 14 fathoms (25.6 m.) water.

**Arenköi Bay.**—The coast is low and swampy for 2 miles east of Kum Kale, after which it becomes steep and cliffy for 7 miles, till Kephez Point is approached. The summits of the hills on the coast are 600 to 700 feet (182.9 to 213.3 m.) high. Vessels may anchor in almost any part of this bay. Soundings of 10 or 12 fathoms (18.3 to 21.9 m.) will be found 300 to 400 yards from the shore, and 21 to 24 fathoms (38.4 to 43.9 m.) over muddy bottom at 1,000 yards. A good berth is with the north part of Arenköi or Ghelmez village bearing 149°, in 16 fathoms (29.3 m.), about 600 yards from the shore. In Arenköi Bay avoid, as a general rule, anchoring in less than 10 fathoms (18.3 m.) because at this limit the soundings decrease rapidly and there might be danger of taking the ground in swinging. The roadsteads are easy to recognize by the numerous vessels generally to be seen at anchor in them. In one or two indentations of the coast landing is possible. There is a pier with 3 feet (0.9 m.) at its outer end near the Turkish quarantine station situated about 3½ miles southward of Kephez Point.

**White Cliffs (Aspra Homata) Anchorage** is situated 2½ miles southward of Kephez Point, near some conspicuous white cliffs. The anchorage is in 12 fathoms (21.9 m.) abreast the white cliffs 600 or 800 yards from shore, with Kuzköi bearing about 110°. There is a pratique office here for the use of coasting vessels.

**Water.**—There are some springs of good water near the shore about ⅓ mile north of the white cliffs.

**Kephez Point** (*40° 06′ N., 26° 23′ E.*).—Kephez Point is low, flat, and distinguished by its white appearance. There is a battery to the northward on the highest part, and an old fort in ruins to the southward.

A white iron tower, a former lighthouse, is located on the southwestern extremity of the point near the battery which is in ruins.

**Kephez Bank,** composed of mud and sand, extends within the 3-fathom (5.5 m.) curve to a distance of 800 yards southwest of the former lighthouse. This bank is a continuation northward of the shallow flat which skirts Arenköi Bay; there is not more than 10 feet (3 m.) water on the bank, and on it there are small rocks awash in places.

**Kephez Point Light,** flashing red, 32 feet (9.8 m.) above the sea, visible 10 miles, is shown from a tower located about 1,500 yards southwestward of the point near the old light tower. (See Light List.)

**Anchorage.**—There is anchorage in the bight named Kephez Bay which will accommodate a number of vessels in from 6 to 15 fathoms (11 to 27.4 m.).

Between Arenköi Bay and Kephez Bay there is little or no current within the dashed line as charted, and sometimes a countercurrent which favors navigation and assists vessels in working up the strait to Kephez Point.

**Caution** is necessary when closely skirting Kephez Bank in order to avoid the strength of the current, as the bank is steep-to. Vessels have frequently been stranded here.

**Ancient Dardanus** (*40° 05′ N., 26° 23′ E.*).—On a low hill at about 1 mile southward of Kephez Point stand the foundations of what is supposed to be the town of Dardanus, a city older than Troy itself, and which gives its name to the modern title of the strait, the Dardanelles.

**Sari Siglar Bay.**—Between Kephez Point and Chanaq, 2¾ miles apart, the coast recedes about a mile, forming Sari Siglar Bay, and affords convenient and roomy anchorage; it is skirted by a flat consisting of sand and mud, extending with depths under 3 fathoms (5.5 m.) ½ mile off in its southern part and to a less distance toward Chanaq, where the bank becomes steeper, disappearing altogether at the mouth of Rhodius River, on the north side of which is Chanaq Kalessi and town.

Entering Sari Siglar Bay from the southward the old lighthouse on Kephez Point should not be brought to bear more than 219°, in order to avoid the shoals in the southern part of the bay.

**Wrecks.**—The wreck of a cruiser, with 4 fathoms (7.3 m.) over it, lies 1.7 miles 180° from Chanaq Kalessi Lighthouse.

A wreck of a large vessel lies about 1½ miles 178° from Chanaq Kalessi Lighthouse.

**Anchorage.**—Vessels anchor in Sari Siglar Bay in 13 fathoms (23.8 m.), muddy bottom, ¾ mile from the shore and 1½ miles to the southward of Chanaq Kalessi, with its western wall bearing about 11°. The best anchorage in the bay is in the center, in 10 fathoms (18.3 m.), with the right extremity of Namazie Fort bearing 333°, distant 1½ miles. Sari Siglar Bay is the best anchorage in the Dardanelles.

## FROM KILID BAHR AND CHANAQ TO KARAKOVA BURNU AND BERGAZ CHAI

**EUROPEAN SHORE—Kilid Bahr.**—The town of Kilid Bahr, of slight importance, stands on the side of the hills which here rise to a height of 650 feet (198.1 m.) above the sea. Its houses are constructed of wood and surrounded by a great number of cypress trees. The population is composed of the garrison of the fort only, and the town offers no resources to vessels which put in for shelter.

It has been already stated that the narrowest part of the strait is between Kilid Bahr and Chanaq, between which the current sometimes attains a velocity of 4 knots; only with a fair wind can a sailing vessel make headway.

**Bank.**—There are no dangers abreast Namazie Point, but adjoining it to the southward is a bank of sand and rock, with depths under 3 fathoms (5.5 m.) extending 1½ miles southward, or abreast the resort northeastward of the Avuzlar, and to 200 yards distance offshore. The edge of the bank is steep-to.

**Coast.**—Beyond Namazie the coast trends north-northwest for 8 miles to the town of Maitos. This part of the coast is free from danger and steep-to, except for one spot between Dermaburnu and Cham Kalessi, where a bank 400 yards long extends 100 yards from the coast. Between Namazie and Cham Kalessi the land rises abruptly from the water, but from the latter place to Maitos a plain with hills behind, borders the sea. There is no anchorage to be found on this part of the coast; the current sets strongly on it, and then toward the Asiatic shore.

**Dermaburnu Battery** is a small earthwork standing at the water's edge ½ mile northward of Kilid Bahr and is conspicuous from the strait.

**Cham Kalessi** (*40° 10′ N., 26° 22′ E.*), 1 mile north-northwest of Dermaburnu Battery, is an old whitewashed stone fort half hidden behind a cliff which slightly projects to southward.

A battery named Kiamleh is situated a little to the northward of Maitos on a hill 400 feet (121.9 m.) high which slopes toward the strait, and to the southward of Khelia Tepe, on a hill 300 feet (91.4 m.) there is another battery.

**Maitos (ancient Madytus)** stands on a low cliff at the end of the valley that extends across the peninsula at this point, and at the foot of Maitos Tepe, which forms the north side of that valley. It is a small town, partly in ruins, with a large, conspicuous Greek church standing in the center and several windmills in a line to the north and south of the town. There is a small cotton factory at the north extremity of the houses, distinguished by its tall chimney. There is a stone pier opposite the center of the town.

At the north end of Maitos the coast makes an almost rectangular bend to the north and east, and thence maintains a general northeast by east direction to Gallipoli, 19 miles distant.

**Anchorage.**—There is anchorage of Maitos in 17 fathoms (31.1 m.), abreast the factory, 500 yards from the shore, but the anchorage is not recommended as the current is variable in this locality. The coast bank here extends 200 yards from the shore.

**Khelia Liman,** situated 1 mile to the north of Maitos, is a well-sheltered bay facing southeast, ½ mile wide at the entrance and 800 yards long. The sides of the bay are formed by the steep slopes of Matios and Khelia Hills, which are destitute of vegetation. A small river empties at the head of the bay. A good road crosses the peninsula from the bay to Gaba Tepe.

**Pier.**—There is a good wooden pier on the south side of the stream at the head of the bay, with ample water for steamers alongside.

**Anchorage.**—There is anchorage in the center of Khelia Liman in 14 fathoms (25.6 m.), and the shore is moderately steep; but the anchorage is seldom occupied, being subject to squalls and out of the track of vessels. Sailing vessels pass this part of the strait either with a fair wind or in tow of a tug.

**Water.**—Water may be procured from a fountain near some ancient ruins on the west side of the bay.

**Bokali Kalessi.**—Three miles northeastward of Maitos, where the remains of an old castle are seen, is the site of the ancient Sestos. Between it and Maitos, on a slightly projecting low, flat, rounded point formed at the entrance of the Bokali Valley by the stream that runs down it, stands an old quadrangular whitewashed fort named Bokali Kalessi, having a conspicuous minaret in its center.

**Bokali Kalessi Light,** flashing green, 38 feet (11.6 m.) above the sea, visible 5 miles, is exhibited from a white iron framework tower located on the forward fortress, 900 yards northeastward of Khelia Liman. (See Light List.)

**Mal Tepe,** a hill 520 feet (158.5 m.) high, situated 1½ miles north-northwestward of Khelia Liman, is conical and conspicuous, having the appearance of a large tumulus. Two miles inland is a small Turkish village named Kojadere.

From the north point of Khelia Liman the coast trends northeastward round the foot of Khelia Tepe, past the mouth of Bokali Valley and along the foot of the coast range, backed by hills from 150 to 350 feet (45.7 to 106.7 m.) high and rising further inland to about 600 feet (182.9 m.) to Sestos Point, 3 miles.

**Bank.**—A bank of 16 feet (4.9 m.) fronts the coast from Khelia to Bokali and extends in some places about 300 yards from the shore, but beyond Bokali not more than 200 yards from shore.

**Submarine cable.**—Three hundred and fifty yards eastward of Bokali Kalessi a submarine cable crosses the strait to Nagara Point. Its termination on the European side is marked by a stone house.

**Sestos Point** (*40° 13′ N., 26° 26′ E.*) is bluff and steep; near its extremity is a ledge 20 feet (6.1 m.) above the sea on which there is a road.

**Ak Bashi Liman,** a bay of which Sestos Point is the southwestern extremity, is ¾ mile broad and ¼ mile long. The north shores are low and sandy, and a small stream falls into the middle of the bay.

On the hills at the back of Sestos Point, forming the west side of Ak Bashi Valley, are the remains of an old Byzantine castle 300 feet (91.4 m.) above the sea. The castle is not easily seen, as its walls are of the same color as the ground on which it stands, but a Tekke or monastery adjoining it, surrounded by plane trees and cypresses, indicates its position.

**Wrecks.**—The wrecks of two steamers partially submerged lie close to the shore in Ak Bashi Liman; there are also other wrecks in the bay, in consequence of which vessels should not anchor here.

**Coast.**—From Ak Bashi the coast, forming many small sandy bays, trends northeastward for 3½ miles to Uzun Burnu; deep water will be found at 200 yards from the shore. A succession of small hills and cliffs rise to a central hill 820 feet (249.9 m.) high, named Bakajak, which is from most views of a remarkable conical shape.

**Uzun Burnu** is very low. A bay, open to the east and the prevailing winds, is formed north of the point. A depth of 20 fathoms (36.6 m.) will be found ½ mile from the shore.

**Ulgar Dere.**—The Ulgar River empties into the strait a few yards to the northward of Uzun Burnu, and in winter is a fair-sized stream but in summer only a small rivulet. To the southward of Ulgar Dere the coast bank, which is composed of sand and mud, extends 300 yards from the shore. About 2 miles inland are the villages of Ulgarköi and Pazarli.

**Coast.**—From Uzun Burnu the coast extends in a northeasterly direction for 4 miles. It is steep and can be approached as close as 200 yards.

Within this coast a ridge extends the whole distance to Inji Liman, culminating in Sarair Tepe, 1,000 feet (304.8 m.) in height. Between it and Karakova Chai are the villages of Burhanköi and Jmaliköi, not visible until above Karakova.

**Inji Liman** is a bay formed by the projection of Karakova Burnu. In the center of the bay there is a good night anchorage, protected from northeast winds, in 7 fathoms (12.8 m.) 600 yards from the shore. In the northern part of the bay the bank extends 300 yards from the shore. The western side of Inji Liman is moderately high, the spurs from Bairak Tepe extending to the beach, but the north and east sides are low.

**Karakova Burnu** (*40° 20′ N., 26° 36′ E.*) is a low, sandy point having deep water 200 yards from shore. The Karakova River empties at the north end of the point. and in winter the whole coast is swampy.

**Karakova Burnu Light.**—A flashing green light, 33 feet (10.0 m.) above the sea, visible 5 miles, is exhibited from a white iron framework tower 33 feet (10.0 m.) high on Point Galata at the eastern extremity of Inji Liman. (See Light List.)

**ASIATIC SHORE.**—**Chanaq Kalessi** is a massive quadrangular fort situated on the shore of the strait and at the north point of Sari Siglar Bay. The north point of Sari Siglar Bay is low and projects a little to the westward toward the coast of Europe, from which it is distant 1,400 yards. The point is free from danger; 200 yards from it the depth is 18 fathoms (32.9 m.). In this, the narrowest part of the Dardanelles, the depth is about 50 fathoms (91.4 m.), sand, stones, and shells, and the deep water is close to either side. The prevailing southerly current runs with great velocity, leaving no slack or eddy near the shores, thus making these narrows the most difficult part of the strait to pass.

**Chanaq Kalessi Light,** flashing red, 47 feet (14.3 m.) above the sea, visible 6 miles, is exhibited from a white iron framework tower 17 feet (5.2 m.) high located on the low battery at the west side of the town. (See Light List.)

**Buoy.**—A red can buoy with a spherical top mark is located 500 yards 26° from Chanaq Kalessi Lighthouse.

**Rhodius River,** running south of the point and under the walls of the castle, discharges at the north point of Sari Siglar Bay, and carries with it in the wintertime a great quantity of sand and mud, which gives a yellowish color to all that part of the channel. The river, nearly dry in summer but in winter a torrent, is crossed by a large wooden bridge, which is seen from the strait.

**Shoal.**—A shoal with a least depth of 17 feet (5.2 m.) lies 300 yards 217° from Chanaq Kalessi Light.

**Chanaq** (*40° 09′ N., 26° 24′ E.*), called by the Turks in ordinary conversation Chanaq Kalessi and in official correspondence Qale Sultaniye, is sometimes called Dardanelles by Europeans. The land at the back of the town forms the plain of Rhodius River, but 3 miles in the interior picturesque hills rise on either side of the river to a height of 1,500 feet (457.2 m.). A clock tower near the northern end of the town is conspicuous from the strait.

**Anchorage.**—Anchoring a vessel off Chanaq by day offers no difficulty, the only precaution necessary being with regard to the current, which here sets on shore. By day pilots are available and take the ship to anchorage. More difficulties are to be met with when anchoring here at night, and the master of a vessel who has never been in the Dardanelles should not attempt it. Besides the strong on-shore set of the current, strong eddies hinder the safe steering of the ship. On the other side of the Dardanelles on a dark night it is almost impossible to reckon the vessel's distance from the shore, as the high mountains in the background and their shadows render the reckoning of distances uncertain. Therefore exact bearings must be taken often, because in one moment the vessel may be found in dangerous proximity to the shore.

**Quarantine regulations.**—No vessel is allowed to proceed inward through the Dardanelles without obtaining pratique at Chanaq, where the doctor and a harbor official board the vessel from a motor boat, and a ship's officer must take the ship's papers ashore in the boat for visa. After that the ship may proceed on her way to Constantinople. It is not necessary to drop anchor when arriving off Chanaq between 8 a. m. and noon and between 3 and 5.30 p. m., because the motor boat then comes alongside vessels as soon as they arrive and the formalities take but a few minutes.

When the state of the sea prevents a sanitary inspection at Chanaq, flags 'MH' of the International Code will be hoisted by day, and three vertical lights (green, white, green) by night, on the flagstaff in front of the health office, to signify that the vessel may proceed to Galata (on the Golden Horn) for her examination.

**Pilots.**—Pilots for the Black Sea may be obtained here. See paragraph "Pilots," page 28.

**Tugs.**—Chanaq is the headquarters of the tugs which lie in Dardan Bay. Masters of vessels are advised to ascertain prevailing rates when concluding arrangements for towage, for there is no fixed tariff and the prices sometimes paid are enormous. The tugs usually tow two or three vessels at a time.

**CHANAQ.**—This is the most important place in the Dardanelles and is the seat of government of the Vilayet. It had a population of 21,713 in 1907.

**Repairs.**—Temporary repairs to a ship's bottom can be effected by divers.

**Supplies** are obtainable in small quantities. Coal is delivered by lighters at the rate of 150 tons a day. Good water is obtainable from water boats.

**Trade.**—The principal exports are grain, valonia, cotton, pottery, wine, and skins; the imports being manufactures, thread, petroleum, coal, sulphur, hardware, and paper.

**Communication.**—There is daily communication with Constantinople. Mail steamers call regularly. There is telegraphic communication to nearly all parts of the world.

**Hospital.**—Seamen are admitted to the Turkish military hospital by permission of the commandant.

**Dardan Bay** (*40° 09′ N., 26° 25′ E.*).—To the northward of Chanaq the coast forms a bay which is a mile across from north to south and recedes a third of a mile. A red building on the coast about 1,100 yards northeastward of Chanaq Kalessi Light and a small turret guardhouse on each side of the pier near the barracks are conspicuous from the strait. Dardan Bay, however, is not a good anchorage, for its shore is bordered by a hard bank of gravel, sand, and rock, having a depth of 1½ to 3 fathoms (2.7 to 5.5 m.) and extending 400 yards from the shore. Outside the bank the water deepens suddenly to 13 and 20 fathoms (23.8 and 36.6 m.). The current sets strongly southwest in the middle and along the south shore of the bay abreast the town of Chanaq, but along the east and north shores there is nearly always a countercurrent, and as vessels must necessarily anchor near the line of separation between the two currrents, they will be alternately in either current. Small vessels use the anchorages, also the tugs, which lie in the shallow water near the shore.

**Mejidieh Battery.**—At the north side of Dardan Bay low hills again come close to the coast line. Under these, and on the north point of the bay, stands the earth work battery of the Mejidieh.

**Anchorages.**—The best berth is in the northern part of the bay, in 18 fathoms (33 m.), mud, with the west end of the Mejidieh Battery bearing 3° and the barracks in the head of the bay 88°. The shoal in the north part of the bay is almost awash and extends 200 yeards from the shore.

The anchorage in Dardan Bay has been reported to be foul in places on account of the moorings of buoys which have foundered; also anchors and cables lost from vessels.

From Mejidieh Battery there is good anchorage alongshore as far as Nagara Point in 10 to 16 fathoms (18.3 to 29.3 m.) 400 to 800 yards from the land.

**Piers.**—There are four piers in Dardan Bay. The one nearest to the lighthouse has a depth of 20 feet (6.1 m.); the other three are only suitable for boats. There are several small landing places, mostly private.

**Submarine cable.**—Vessels are cautioned not to anchor in the vicinity of the submarine telegraph cable which passes from the north angle of Chanaq Kalessi to the north angle of Kilid Bahr.

**Keoseh Kalessi.**—A small, low, flat point projects slightly at ¾ mile to the northward of the Mejidieh Battery, and on this is Keoseh Kalessi, the ruins of an old stone fort.

**Nagara Liman** may be said to commence to the northward of Keoseh Kalessi. There is good anchorage in 10 to 16 fathoms (18.3 to 29.3 m.) 400 to 800 yards from the shore in any part of the bay, well protected from northeast winds and out of the current. The best berth is north of the landing place called the Tekke. There is an area of foul ground ½ mile westward of this landing place. All Nagara Liman is in the eddy current which runs to the northward, the strength of which depends upon the strength of the main current.

**Wreck.**—The sunken wreck of a vessel with two masts showing about 7 feet (2.1 m.) above water is situated in Nagara Liman about 400 yards westward of the barracks northward of Tekke.

**Piers.**—There are four piers between Tekke and Nagara Kalessi, two of which, near the barracks, have 16 and 18 feet (4.9 and 5.5 m.), respectively, at their outer ends.

**Nagara Point** (*40° 12′ N., 26° 25′ E.*), a long, low, sandy spit which projects to the westward from the coast hills 1,600 yards, is distinguished by a large white square fort, Nagara Kalessi, at the northwest angle of which there is a mosque, also white, frequently mistaken for the lighthouse. This fort is built on the site of the ancient castle of Abydos; there is a battery ½ mile southeast from it, and another one south of Abydos Point.

A submarine telegraph cable crosses the straight from Nagara Point to Bokali Kalessi.

**Nagara Kalessi Light.**—A flashing white light, 36 feet (11 m.) above the sea, visible 5 miles, is shown from a white circular tower 20 feet (6.1 m.) high on Nagara Point. (See Light List.)

The light house is not conspicuous in the daytime, as it is only a few feet above the parapet. The white minaret of the mosque, a few yards to the east of the keep, is more readily distinguished.

**Nagara Spit.**—The extremity of Nagara Point is a sharp-pointed bank of sand that runs out to the westward, shelving gradually under water 400 yards from the parapet of the fort, where it drops to 4 fathoms (7.3 m.). Outside this the water gradually deepens to 6 fathoms (11.0 m.) 800 yards from the fort. The bank appears to extend much farther from the shore, but this appearance is simply due to discolored water.

The anchorage is foul about 1,600 yards 204° from Nagara Kalessi Lighthouse.

Northwestward of Nagara Kalessi Lighthouse the anchorage is fouled by sunken obstructions.

**Buoy.**—A spherical buoy surmounted by a tripod carrying an openwork spherical day mark, the whole painted red, is moored in 5½ fathoms (10.1 m.) 600 yards west of Nagara Point Lighthouse.

The current, the direction of which is here west-southwestward, sets strongly over the end of the bank and past the buoy. Vessels should not attempt to pass inside the buoy, as the water shoals suddenly.

**Wreck.**—A wreck, with two masts showing about 7 feet (2.1 m.) above water, lies 1,150 yards 193° from Nagara Kalessi Lighthouse. An iron drum is placed over the masthead of the northern mast.

**Abydos Point** (*40° 12′ N., 26° 25′ E.*).—From Nagara Point the coast trends eastward a little more than ½ mile, at which part the line of grass-covered low coast hills from Dardan Bay extends to the shore and forms Abydos Point, which is a steep-looking cape about 100 feet (30.5 m.) high, and shows green or yellow, according to the season. It is steep-to, but the bank of rock and sand extends only 200 yards from the shore, when it deepens suddenly to 13 fathoms (23.8 m.). About ¾ mile south of the point on this line of hills is an old redoubt that stands up very prominently over Nagara Liman.

**Coast.**—From Abydos Point the coast runs in an easterly direction for 3 miles, and then curves round to the northeastward for 6 miles to Kojuk Burnu, the shore being indented by small, shallow bays and skirted by a bank of sand and mud extending in some places ½ mile. This shore is well sheltered from all southerly winds, but a vessel could only lie here in fine weather if the wind blew from the northeast. On all this part of the coast an eddy exists, which, though weak, is made use of by sailing vessels.

**Abydos Bank,** about ½ mile in extent, with 16 feet (4.9 m.) on its shoalest part, lies from ½ to 1 mile east of Abydos Point and about 900 yards from the nearest part of the shore.

**Directions.**—The summit of Maitos Tepe kept a little open of Abydos Point, 260°, leads in 4 fathoms (7.3 m.) northward of Abydos and in about 6 fathoms (11.0 m.) northward by Ayiani Bank.

**Ayiani Burnu** is low, rocky, and white, and composed of a conglomerate of oyster shells.

**Bes Chamlik, or Seven Firs** (*40° 11′ N., 26° 27′ E.*).—At the back of Ayiani Burnu and 1 mile inland stands a conspicuous clump of seven fir trees, known by the Turks as Chamlik.

**Ayiani Bank.**—From Ayiani Burnu the coast bank of that name extends northeast about 900 yards, at which spot there is a depth of 8 feet (2.4 m.); the edge of the bank then turns to the eastward, and ½ mile farther on approaches the shore to within 400 yards. The general depth on the bank is under 2 fathoms (3.7 m.).

**Coast.**—Kair Burnu, low and formed of white rock, is similar in appearance to Ayiani Burnu. From it the land again sweeps round to the southeast and northeast, forming a shallow bay to the point where Mussaköi Chai empties into the sea. Thence the coast extends, with little deviation, northeastward 2 miles to Saltik Liman Burnu.

**Mussa Bank,** a projection of the coast bank, lies off the mouth of Mussaköi Chai, a depth of 3 fathoms (5.5 m.) being found at 700 yards from the shore. Yapildak Chai, ½ mile northeastward of Mussaköi Chai, may be known by a flat piece of land immediately northeastward of the river. Both these rivers, though not absolutely dry, cease running in the summer, and except in time of floods are never more than small streams.

**Wreck.**—A sunken wreck lies southeastward of Mussa Bank and about 1,400 yards westward of Mussaköi Chai entrance.

**Directions.**—Bes Chamlik, in range with Kair Burnu, 225°, leads northwestward of Mussa Bank in 15 fathoms (27.4 m.). Yapildak Tepe, a conical tree-covered hill, bearing 125° leads to the eastward of it in 5 fathoms (9.1 m.).

**Anchorage.**—After passing Mussa Bank a vessel can approach the shore within 300 yards as far as Saltik Liman Burnu. There is excellent anchorage all along this shore, especially in the bight between the Mussa and Ayiani Banks, in 12 fathoms (21.9 m.), mud, and vessels working up are recommended to anchor on this side of the strait in preference to the other, as the water is shoaler and the eddy favorable.

**Aspect.**—All the shore from Ayiani to Yapildak Chai is low, and in many places swampy in winter. Behind this plain, however, the hills rise gradually, till, 9 miles inland, they culminate in the fine pyramidal peak of Aghi Dagh, 3,010 feet (917.4 m.) above the sea. This part of the country is poorly cultivated, but several villages are scattered throughout it, the whole presenting to the eye an agreeable picture, large numbers of trees covering the valleys and slopes.

The villages seen from the strait are: Kemel, high up the hills behind Ayiani, and just under a large, dark, quadrangular plantation; Okjolar, a small village farther to the northeast; Kizilkechili, a little below the last; Yapildak, of which only a minaret and a few houses are visible from the sea over the trees of Yapildak Tepe. None of these villages are conspicuous except in certain lights, when the white minarets and mills shine out brightly.

**Bergaz Iskalesi** (*40° 15′ N., 26° 34′ E.*), a bay of 1,400 yards across and open to the northwestward lies northward of Saltik Liman Burnu, a conspicuous headland of white rock 70 feet (21.3 m.) high, and the only rocky point in the neighborhood for some miles; the north point of the bay is low and sandy. A conspicuous knot of trees, named Bergaz Clump, is situated on the northeast summit of some hills 1½ miles inland, and when bearing 140° leads into Bergaz Iskalesi, but the trees disappear when the vessel is close inshore, the coast range hiding them. Bergaz Iskalesi is the place of embarkation for the produce of the rich valley of Bergaz and the district connected with it. A few fishermen's huts are situated at the head of the bay.

**Anchorage.**—Ships anchoring in Bergaz Iskalesi must be careful not to run too far into the bay, as the 3-fathom (5.5 m.) curve extends 500 yards from the coast and then quickly deepens to 7 fathoms (12.8 m.). The best anchorage is in 14 fathoms (25.6 m.) mud, with the lighthouse on Kojuk Burnu showing just outside of the north point of Bergaz Iskalesi.

**False Bay.**—To the northeastward of Bergaz Iskalesi another small bay is formed, filled by a sand bank with only 1½ fathoms (2.7 m.) at its edge, which projects 200 yards outside the bay. The shore is low and sandy.

**Bergaz Asmak River.**—The bank in False Bay has been formed by the débris brought down by the river Bergaz Asmak, which runs into the head of False Bay and is in summer a lagoon, but in winter is fed by the water from Kangarli Hills.

**Bergaz village,** exhibiting three minarets, is comparatively large and situated 3 miles from the coast on the hills facing the strait; the village is visible from a vessel in the strait. On the hills bordering the plain of Bergaz are also the hamlets of Kangarli, Gökköi, and Sandal Ovasi, but none of them are visible from the strait. Over the hills is again seen the summit of the mountain Aghi Dagh.

**Kojuk Burnu** (*40° 17′ N., 26° 35′ E.*) is a low, flat, rounded point, and from a distance appears to project much farther into the strait than it actually does. The lighthouse, which stands on the extremity of the point, appears also to rise from the water itself. The point is nearly steep-to, the shoal water not extending more than 100 yards from the shore, and the strait is here narrowed to 1½ miles. The land of which Kojuk Burnu is a part is the end of the large valley and plain of Bergaz, which extends from the shore in a southeasterly direction. The mouth of the Bergaz River is situated 1 mile to the northeastward of the lighthouse and is never entirely dry.

**Kojuk Burnu Light,** flashing red, 38 feet (11.6 m.) above the sea, visible 6 miles, is exhibited from a mast on a white house located north-northwest of Bergaz village and about ½ mile northward of the mouth of the Bergaz Chai. (See Light List.)

**Bergaz Bank.**—Northward of the lighthouse the shore of Kojuk Burnu gradually curves around to the eastward and then sweeps east-southeastward, forming a bay of some extent. At the point where this bay commences Bergaz Chai empties into the strait and has deposited opposite to its mouth a bank which fills all the bay. The 3-fathom (5.5 m.) curve of soundings is nearly 1,000 yards from the shore, the 5-fathom (9.1 m.) curve, nearly 1 mile, and the portion of the bank between these depths makes a good overnight anchorage, the holding ground being good in from 4 to 4½ fathoms (7.3 to 8.2 m.).

## FROM KARAKOVA BURNU AND BERGAZ TO THE SEA OF MARMARA

**EUROPEAN SHORE—Coast.**—The villages Galata and Bairköi are conspicuous, as they stand on the summit of the coast range. Galata is ½ mile from the sea and Bairköi 1½ miles. There are a number of windmills close to both villages.

Beyond the entrance to Karakova River the coast trends in nearly a straight line 3 miles northeastward to Galata Burnu, with a sandy beach, and is steep-to.

**Galata Burnu,** the southwestern termination of the Bay of Gallipoli, is a low point at the back of which is the plain formed by the entrances of the valleys of Kuzlu Dere and Buyuk Dere, that circle round the mountain of Akyarlar.

**GALLIPOLI BAY.**—From Galata Burnu the coast trends to the north and east, forming Gallipoli Bay, which is 3 miles broad and about 1 mile long. The bay is divided into two nearly equal parts by a point which projects about 800 yards into the channel. The shores of the bay for the most part suddenly terminate in low yellow cliffs about 80 feet (24.4 m.) high, with small ravines between and cultivated slopes in the background. The mountain of Akyarlar, 1,050 feet (320.0 m.) high, with its picturesque white and yellow chalk cliffs, lies 3 miles within Galata Burnu.

The southwestern portion of Gallipoli Bay is skirted by a rocky shoal in some places nearly awash. The shoal is ½ mile long and extends 600 yards from the shore.

**Middle Bank** (*40° 24′ N., 26° 39′ E.*) fills the northeastern half of Gallipoli Bay. The center and most projecting part of the bank lies 1 mile 250° from Gallipoli Point and nearly 800 yards from the shore. Here the soundings suddenly diminish from 5 to 2½ fathoms (9.1 to 4.6 m.), then shoaling toward the shore.

A tall chimney near Uch Bridge, bearing 24° and in range with the easternmost of a row of mills to the north of the town, leads clear of the bank. This bridge is a wooden one and spans a small stream called the Uch Köpru Dere.

**Anchorage.**—The anchorage in Gallipoli Bay is much frequented by sailing vessels as a night anchorage when working to windward. It is well protected from all winds except those from south and east. These winds, however, raise but little sea, and the holding ground is good. The best berth is just to the eastward of the bearing given for clearing Middle Bank, where good holding ground will be found in about 11 fathoms (20.1 m.) with the south point of the town bearing 92°, distant 1,200 yards. Near the town, and in a more convenient position for communicating, the water is deeper.

Small craft may anchor nearer the town, observing that the shore flat extends 300 yards off abreast the bridge. The swell from the Sea of Marmara sets around Gallipoli Point at times.

**Gallipoli Point** (*40° 24′ N., 26° 41′ E.*).—The east point of Gallipoli Bay is rocky, and foul ground extends off it to a rock with 12 feet (3.7 m.) over it at 250 yards southwestward of the point. There is deep water close outside the rock.

From Gallipoli Point the shore trends northeastward for ½ mile, forming the sea face of the town of Gallipoli. This piece of the coast is all rocky, with low, perpendicular cliffs, and outlying rocks extending about 60 yards from it. The coast then sweeps in round the lighthouse point to Baschesme Liman, the north anchorage of Gallipoli.

**Gallipoli Light.**—A flashing white light, 111 feet (33.8 m.) above sea level, is shown from a white masonry tower 30 feet (9.1 m.) high located on the cliff northeastward of the town. (See Light List.)

**Conspicuous objects.**—The most conspicuous objects in the town are a tall chimney on the shore at the western end of the town, a tall minaret seen on the sky line, and a ruined belfry southwestward of the lighthouse.

**Cambers.**—On the south side of Gallipoli town are two small cambers. The outer one has an area of 1½ acres and a depth of 7 feet (2.1 m.), with an entrance 30 feet wide, and is much used by coasting craft.

The inner one, by the side of which is an old Genoese tower, is about one-third the size of the other and not much used.

**Pilots.**—See paragraph " Pilot and tug service in Turkish waters," page 29.

**GALLIPOLI,** the largest town on the Dardanelles, is built on the rocky promontory between Gallipoli Bay and that of Baschesme, and has a population of about 20,000. The town is the seat of government of the Province of Gallipoli, in the Vilayet of Adrianople. It possesses many mosques and minarets and is noted as a burial place for Mussulman saints.

**Supplies.**—Provisions are procurable; other stores scarce. Five hundred tons of coal usually in stock, but only supplied in case of necessity. Water obtainable from fountain near cambers, but runs slowly; usually obtained from fountain at Baschesme Liman.

**Trade.**—Principally in grain, cotton, and livestock sent to Constantinople, besides which canary seed, cheese, sesamum, and aniseed are exported; imports, manufactures, sugar, coffee, rice, sacks, petroleum, etc.

**Communication.**—There is a telegraph office.

**Quarantine.**—The health office, which stands just westward of the entrance to the port, is a yellow building. Vessels in quarantine are not given pratique here unless pratique has been already given at Chanaq or Constantinople. They are permitted to take in provisions and send telegrams if they have health guardians on board.

Coasting vessels can obtain pratique here.

**Baschesme Liman** is situated on the northern side of the promontory of Gallipoli. Round its rocky south point the coast trends westward and then, losing its rocky character at once, sweeps round northward, with a sandy beach for 800 yards, when it turns eastward, and again becoming rocky runs with little indentations 1 mile to the north point of the bay, called Eski Fanar Burnu.

**Anchorage.**—There is anchorage in Baschesme Liman in 13 fathoms (23.8 m.) about 500 yards from the shore, with Gallipoli Lighthouse bearing 220°. There is no proctection here from northeast winds; a considerable swell sets in, and the holding ground is not so good as that of Gallipoli Bay. Shoal water extends from the sandy head of the bay for 200 yards, and a northeast wind makes a heavy surf in it; otherwise the bay is clear of danger.

**Water.**—Landing can generally be effected in the northwest corner of Baschesme Liman, under the lee of a small, rocky point not far from the fountain that gives its name to the bay and where casks can be filled in boats.

**Eski Fanar Burnu** (*40° 25′ N., 26° 42′ E.*) is a rocky point about 25 feet (7.6 m.) high. Off the point rocky ground of 6 fathoms (11 m.) depth, on which the water is much discolored, extends for about 200 yards.

**Wreck.**—The wreck of a cruiser, with 2½ fathoms (4.6 m.) over it, lies 4¾ miles northeastward of Eski Fanar Burnu.

**Coast.**—From Eski Fanar Burnu the land trends northward for 2 miles in a long extent of sandy bay, having deep water within 400 yards. An isolated rock, named Chankair, lies on the beach 800 yards north of the point. Eastward of the sandy beach a shoal bank of less than 3 fathoms (5.5 m.) extends off the land for 700 yards, but gradually closes the shore, till 1 mile farther east it is but 200 yards distant. The plain behind this bay is called Ok Meidan and is well cultivated. Through it passes the road from Gallipoli to the interior, across the Isthmus of Bulair.

From the head of this bay the coast trends east-northeast past the foot of Karaiokus Hills, then stretches away with very slight deviations from a straight line for 30 miles, forming the north shore of the western part of the Sea of Marmara.

**ASIATIC SHORE—Coast.**—From the mouth of Bergaz River the coast trends east-southeast for ¾ mile, and then northeast for 5½ miles, with a few small indentations, as far as Lapsaki. All the shore line is low and composed of either sand or shingle, but from the head of the bay above the river eastward the land rises at once, and thence gradually to the summit of the Lesköi Tepesi Range, 3 miles inland, where the hills rise to 1,230 feet (374.9 m.) above the sea. The background, one monotonous uniform slope, without cultivation, house, or feature of any kind to relieve it, is covered with short, scrubby brushwood.

**Lapsaki Liman,** formed by the curve of the land to northward, is 1 mile across from the low point on the southwest which juts very slightly into the strait and on which stand five windmills in a row. Chardak Ova, the northern point of the bay, which is also low, is the extremity of a flat plain projecting from the foot of the hills behind.

**Anchorage.**—Good anchorage may be obtained in Lapsaki Liman with protection from northeast winds, but there is a bank with a steep outer edge extending from the shore 550 yards which necessitates caution in anchoring.

The best berth is in 19 fathoms (34.8 m.) 1,200 yards southwestward of Chardak Ova, with the outer mill of Lampsaki bearing 175°, and a large rounded tree at the head of the bay 105°. In this position slack water or an eddy current, never very strong, will be found, and vessels are well protected from the swell from the Sea of Marmara. In the northeast part of the bay the shore is steep-to.

**LAPSAKI,** on the southern shore of the bay, possesses a conspicuous mosque and minaret and is surrounded by trees. It is situated on a slightly rising slope at the northern entrance of the valley of Kush Ovasi, through which the Lapsaki River runs and empties into the sea 500 yards southwest of Lapsaki Point. Population about 1,400.

**Supplies.**—Provisions obtainable. Water is brought from the hills by pipes to fountains in town, whence it is obtained in casks.

**Trade.**—Vegetable produce, cattle, sheep, and wine shipped to Constantinople.

**Communication.**—Telegraph office.

**Sanitation.**—Unhealthy, probably due to swampy land at river mouth and bad quality of water, which is said to produce fever.

**Quarantine.**—Pratique office for coasting vessels.

**Chardak Bank.**—From Chardak Ova the coast takes an east-northeast direction for 1½ miles to the mouth of Chardak Lagoon. Shallow water of 3 fathoms (5.5 m.) and less extends from Chardak Ova Point 400 yards, and then follows the direction of the coast to Chardak Lagoon.

**Chardak Liman.**—Northeastward of Chardak Ova is Chardak Liman, formed by the abrupt projection of Chardak Spit to the northwest. The entrance to Chardak Lagoon is at the northeastern part of this bay, and the bay, though bordered for 600 yards by the shoal bank above mentioned, forms another good night anchorage for a vessel about to work through Gallipoli Strait. The village, containing a population of about 1,200, is pleasantly situated on the well-cultivated plain bordering the sea at this part, with the hills of Kale Bair rising behind to a height of 830 feet (253 m.).

**Anchorage.**—A vessel may anchor 300 yards from Chardak Burnu in 14 fathoms (25.6 m.), with the lighthouse bearing 25° and the domed mosque in the village of Chardak 121°.

**Chardak Burnu Light** (*40° 23′ N., 26° 41′ E.*).—A flashing red light, 38 feet (11.6 m.) above the sea, visible 6 miles, is exhibited from a mast on a white house located on the low sandy point opposite Gallipoli. (See Light List.)

**Chardak Spit and Lagoon.**—Chardak Lagoon is formed by a narrow strip of sand extending southwestward 1¾ miles from the mainland, terminating in Chardak Spit. The breadth of the lagoon at the entrance is 250 yards, widening inside to 700 yards. Chardak Spit is steep-to on its southwest side.

The lagoon is too shallow to be of use except to the small coasters, who use it as a careening place. The depth of water at the entrance, where there is a small wooden pier, is 11 feet (3.4 m.), shoaling to 8 feet (2.4 m.) 200 yards farther in. The remainder of the lagoon is very shallow.

**Shoals.**—A patch of 18 feet (5.5 m.) lies ½ mile 15° from Chardak Burnu Lighthouse and is connected with Zinjir Bozan Bank by a shoal of 24 feet (7.3 m.). Patches of 24 feet (7.3 m.) and 27 feet (8.2 m.) lie 400 yards to the southwestward of the 18-foot (5.5 m.) patch.

**Gallipoli Strait,** the northeast entrance of the Dardanelles and the western entrance to the Sea of Marmara, is 1¾ miles wide between Gallipoli and Chardak Spit.

**Zinjir Bozan Bank** (*40° 25′ N., 26° 46′ E.*).—The edge of this bank, which is also known as Diana Shoal, extends from the shore near Chardak Burnu Lighthouse in a northeasterly direction for 3 miles to its northernmost extremity; it then turns east-southeast and trends in again to the shore 1 mile beyond Fanus Hills. The edge of the bank at its northern extremity is 1 mile from the shore. Depths of from 2 to 4 fathoms (3.7 to 7.3 m.) will be found near the edge of the bank, but the bottom is uneven.

The western edge of the bank outside the 5-fathom (9.1 m.) curve is everywhere steep-to. On the northern edge there are several 3-fathom (5.5 m.) heads, outside which the water deepens suddenly from 5 fathoms (9.1 m.) to 15 and 25 fathoms (27.4 and 45.7 m.).

**Light buoy.**—A buoy with truncated cone top mark, painted in red and white horizontal bands, exhibiting a group flashing red light, 13 feet (4.0 m.) above water, visible 5 miles, is moored 1¼ miles 336° from the ruins of Fanus Lighthouse. The light on this buoy is not to be depended on.

**Directions.**—Gallipoli Lighthouse in range with the center of the remarkable white chalk cliffs near the summit of the rounded Akyarlar Dagh, bearing 257°, leads in 12 fathoms (21.9 m.) over the position of the light buoy, to the northward of Zinjir Bozan Bank, but very close-to. Care must be taken not to bring the lighthouse to the right, or north, of the center of these cliffs should the light buoy be out of position. These points are easily distinguished. The lighthouse is white and the cliffs generally show white also. After rain they will, however, appear of a reddish yellow and are not so conspicuous.

Chardak Lighthouse in range with the center of Derebidi, a low rounded hill near Saltik Liman Burnu, bearing 220°, will lead clear to the westward of the northwest edge of Zinjir Bozan.

A vessel working to the eastward must be careful not to pass southward of the clearing range for the north part of the shoal until she brings the highest part of some white cliffs in range with the summit of Koja Flamur Hill, 136°. This hill is easily distinguished by an enormous tree towering above the other foliage on the hill and looking like a large stone, and when the tree bears 138° a vessel can stand in as close as ½ mile from the shore.

**Fanus Hill** (*40° 24′ N., 26° 46′ E.*).—The coast line inside Zinjir Bozan Bank is low. Chardak Spit extends east-northeastward 1¾ miles, and the shore then turns gradually round to the eastward, where there are some low cliffs and a small isolated hill 120 feet (36.6 m.) high, presenting a cliff on its sea face, and named Fanus Hill. On the hill stands the ruins of an old lighthouse tower.

**Directions.—Aegean Sea to Gallipoli.**—A steam vessel or a sailing vessel with a strong fair wind entering the Dardanelles and proceeding to Constantinople should, after having given a prudent berth to Tenedos Island and the Rabbit Islands, steer for the fairway of the entrance on a bearing of about 73°.

Within the entrance it is recommended to keep on the European side of the strait at about 400 yards offshore, except in the narrows at Chanaq, where the current is weaker in the center of the strait than at the sides.

Beyond the Narrows keep on the Asiatic side to avoid the current, and steer to pass close outside Nagara Buoy; vessels should not pass eastward of the buoy, as there is but little water and the current sets toward Nagara Spit.

After passing Nagara Buoy steer for Sestos Point until within 600 yards of the European shore; then steer alongshore, keeping at that distance outside all points and crossing the entrances of the several bights until the Sea of Marmara is reached. Steer directly across Gallipoli Bay from Galata Burnu to Gallipoli Point to avoid Middle Bank in the bay. On this course a steam vessel will nearly always be in the adverse current, but not in its strength, and the time lost in stemming it will be more than gained by the directness of the course.

**Gallipoli to the Aegean Sea.**—In making this passage it is only necessary to keep in the center of the strait. In a sailing vessel if the wind should be contrary make short tacks, taking care to keep as much as possible in mid-channel. If it should blow too hard from the southwest to allow of proceeding into the Grecian Archipelago, then anchor on the Asiatic coast in one of the good anchorages.

**Currents.**—The set of the current in various parts of the Dardanelles given here, as well as at the places affected, should be studied by the seaman in conjunction with the directions for proceeding through the strait.

Between Kum Kale and Seddul Bahr, at the entrance, the current runs west-southwestward at the average rate of 1½ knots, the maximum being about 3 knots. The current is stronger on the Asiatic side, and runs along the edge of Yenishehr Bank with considerable strength.

The current runs close past Kephez Point, nearly 10 miles above Kum Kale, on the Asiatic shore, but to the southward of it, to Kavanlik Liman, there is an eddy extending nearly a mile from the land, or little or no current within the dashed line on the chart.

The main current again strikes the shore on Mendere Bank, and runs westward to Kum Kale Point, and to sea.

In Sari Siglar Bay, northeastward of Kephez Point, there is an almost constant eddy, setting from Kephez Point to Chanaq, within the dashed line, but this bay is so encumbered with flats that the eddy is not of much use to vessels, except that it makes the anchorage a quieter one.

On the European side, slack water extending 300 yards from the shore will be found for 3 miles southwestward of Namazie Point, abreast Chanaq, to the mouth of the Suandere, but from thence to near Seddul Bahr the main current strikes the shore, passing over the rocky bank in Morto Bay, and at about 400 yards off Seddul Bahr.

At the head of Morto Bay there is a slight eddy that sometimes extends to Eski Hissarlik, its eastern extremity.

THE NARROWS.—At Chanaq Kalessi the current is more rapid than in any other part of the strait, and this is the most difficult place for a sailing vessel to pass. It extends from shore to shore, with no eddies, and is stronger at the sides than in the center. Its average rate is about 2 knots, its maximum 5 knots. South and southwest of the Narrows there are eddies on either side as before mentioned.

NAGARA POINT.—At Nagara Point the average rate of the current is about 2 knots. The stream sets west-southwestward over the end of the spit across to the European shore, to the southward of Maitos, and is there deflected to the southward, along shore. On the European side it follows the line of coast from Sestos Point to Bokali Kalessi. In Khelia Liman, the bight between Bokali Kalessi and Maitos, there is an eddy.

Under the lee of Nagara Point, as far south as Chanq Kalessi, there is an almost continuous eddy extending some distance from the shore.

At Kojuk Burnu, and along the shore northward of it, the maximum strength off the point is about 2½ knots. This is one of the most difficult points for a sailing vessel to pass, there being no eddy on either side.

Southward of Kojuk Burnu there is, however, slack water, or a strong eddy sometimes, but of no use for navigation to the northward of Saltik Liman Burnu, 2 miles distant, as it extends only a short distance from the shore. Between Saltik Liman Burnu and Abydos, the eddy is sufficiently broad for a vessel to work to windward in.

On the European side, the current runs close along the shore the whole way to Bokali Kalessi, the only exception being a slight slack in Ak Bashi Liman.

At Galata Burnu the strength of the current on the average is 1 knot, and here there is no eddy on either side of the strait.

At Karakova Burnu, 3 miles below Galata, the same may be said, but there is slack water at the head of Inji Liman on the southwestern side of that projection.

In Gallipoli Strait, the current becomes stronger, and varies between ½ and 2 knots. The current extends from shore to shore, but is slacker at the sides than in the middle.

In Gallipoli Liman there is an eddy setting eastward towards the town and point.

In Chardak and Lapsaki Limans the same weak eddy exists, but is by no means regular.

See also pages 45 and 46.

**Anchorage.**—As a rule a vessel can anchor for the night in almost any part of the strait; but, generally speaking, the Asiatic side is the better, as the water is not so deep and it shoals less suddenly. The holding ground is good.

In general vessels should anchor close inshore, in no great depth of water and out of the influence of the currents; for the greater the depth the greater the danger of dragging the anchor and of being carried away by the strength of the current, especially if it should blow hard from the northward.

The eastern part of the strait between Nagara Point and Gallipoli, when it blows hard from the north and northeast in the Sea of Marmara, is far from affording the same shelter as its western part, because both sea and wind sweep violently through it. Gallipoli Bay is the only anchorage where a vessel can ride in safety during a gale from this quarter.

# CHAPTER III

## SEA OF MARMARA

**General description.**—See page 21.

**EUROPEAN SHORE—Dohan Aslan Burnu** (*40° 30′ N., 26° 52′ E.*).—From Eski Fanar Burnu (Gallipoli) the coast trends in an easterly direction 9 miles to Dohan Aslan Burnu, which has yellow sloping cliffs 95 feet (29 m.) high and projects so little that, unless very close in it does not appear as a point. On the rising ground above Dohan Aslan Burnu is a large white farmhouse, and farther inland and higher a remarkable conical mound 66 feet (20.1 m.) in height standing on a spur of the Magharalik Hills at an elevation of 740 feet (225.5 m.). This, supposed to be the tumulus of Lysimachus, is known by the Turks as Mal Tepe and is an excellent mark for identifying the point.

**Dohan Aslan Bank.**—Off Dohan Aslan Burnu is a bank of sand and rock called Dohan Aslan Bank, the rounded extremity of which is 1,300 yards from the shore. Here there is a depth of 3 fathoms (5.5 m.), with 4 and 5 fathoms (7.3 and 9.1 m.) immediately outside; the water then deepens very gradually to 20 fathoms (36.6 m.) 3 miles distant.

The shoalest part of the bank is 1,100 yards from the shore and has but 9 feet (2.7 m.). Gallipoli Point in range with the notch between Akyarlar (known by its white cliffs) and the next summit to the left, bearing 239°, leads southward of Dohan Aslan Bank in about 9 fathoms (16.5 m.).

There is a 3-fathom (5.5 m.) channel used by the coasters inshore, but it is obstructed by a shoal head of 10 feet (3.0 m.).

**Obstruction.**—A sunken wreck (1920), over which there is a depth of 2½ fathoms (4.6 m.), lies about 4¼ miles southwestward of Dohan Aslan Burnu and 1,200 yards offshore.

**Light buoy.**—A conical buoy painted red and white in horizontal bands, surmounted by a truncated cone and exhibiting a flashing white light, 11 feet (3.3 m.) above the water, visible 8 miles, is moored about 600 yards southward of the eastern 3-fathom (5.5 m.) extremity of the shoal.

**Buoy.**—The southern edge of Dohan Aslan Bank is marked by a red buoy in 8 fathoms (14.6 m.), 1 mile 191° from Dohan Aslan Burnu.

**Wreck.**—The wreck of a light vessel, with masts showing, lies 1,500 yards 142° from Dohan Aslan Burnu.

**Caution.**—As this wreck lies farther offshore than the light buoy, vessels in passing should give the light buoy sufficient clearance.

**Bulair,** a large Turkish village on the north side of the Karaiokus Range, can not be seen from the sea. The summit of its minarets only may be discerned from a considerable distance eastward.

**Dohan Aslan Bay.**—Beyond Dohan Aslan Burnu the coast extends northeast, and curving round to the east forms a long shallow bay to Inje Burnu, 7 miles distant. This bay is free from danger. Dohan Aslan Bank soon turns into the shore, and the 3-fathom (5.5 m.) curve is then nowhere more than 700 yards from it. The shore is sandy, backed by low clay cliffs similar to Dohan Aslan to the west, but soon becoming low to eastward and in some parts swampy.

At the back the hills of Magharalik drop to the eastward. On its east spur is the village of Hexamili, of which only a few mills are visible from the sea.

**Inje Burnu** (*40° 33′ N., 27° 00′ E.*) forms a cliff 65 feet (19.8 m.) high facing the sea, and gently rises inshore to the west end of the Halva Tepe Range, which commences here and extends along the background of the coast to the eastward till behind the village of Heraklitsa it culminates in the peak of Elia Tepe.

Off Inje Burnu a bank of rock and sand with 4 fathoms (7.3 m.) on it extends ¾ mile. A shoal head of 3 fathoms (5.5 m.) lies 1,300 yards 212° from the point.

A sunken obstruction is reported to lie about 2¼ miles southwestward of Inje Burnu.

**Anchorage.**—There is good anchorage 1 mile westward of Inje Burnu in 8 fathoms (14.6 m.), with the point bearing 64°.

**Coast.**—Beyond Inje Burnu the land trends northeastward for 3 miles, curving round to east for 4 miles farther to Sharkoi. This part of the coast is free from danger and can be approached to a distance of 400 yards. The land rises from the coast sometimes as low cliffs, sometimes gradually, to the Halva Range inland. The low lands at the foot of the hills all along this part of the coast are subject to inundations, particularly in the summer. The village of Kisiljadere is seen on this rising ground 1½ miles inland at an elevation of 420 feet (128.0 m.).

**Sharköi** is a large village on the seashore, standing on the low plain at the foot of Arapli Tepe. It has two mosques, three Greek churches, and mills eastward and westward of the town, and the population numbers about 5,000.

**Water.**—There is a small wooden pier abreast the center of the village, where there is a fountain of good water.

**Wrecks.**—Two wrecks lie immediately southward of Sharköi, a small steamer, with a mast showing 50 feet (15.2 m.) above water, and a large vessel with two masts showing 65 feet (19.8 m.) above water.

**Anchorage.**—The anchorage of Sharköi is not recommended; there is good holding ground, but no protection from prevailing winds. The bank that borders the shore for 300 yards falls suddenly into deep water. The best berth is in 16 fathoms (29.3 m.) about 500 yards from shore.

**Heraklitsa Burnu** (*40° 37′ N., 27° 11′ E.*), 3 miles to the eastward of Sharköi, forms the south point of a small bay which lies eastward of it, in which is the village of the same name. The point is broad, low, and sandy, and off it the shoal bank extends 500 yards. Inshore from Heraklitsa Burnu the country is level for about ½ mile, when Arapli Tepe rises abruptly. On this hill the village of the same name, at a height of 880 feet (268.2 m.), is conspicuous.

To clear Heraklitsa Burnu Hora Light, distant 7½ miles, should not be brought to bear eastward of 50°. The light can be seen over the intervening land.

**Caution** is necessary when coming from the Bosporus to give this point a good berth, particularly in hazy weather, as the haze hangs over the low land and so hides it that the land where visible within has been assumed to be the point, which has been the cause of many wrecks here, one of which is still charted. The current also has a tendency to set vessels towards the coast when bound outwards.

**A patch** of 1 fathom (1.8 m) is charted off Heraklitsa town, just within the edge of the 5-fathom (9.1 m.) curve.

**Merefte (Myriophyto)**, a large, thriving village 3¼ miles east-northeastward of Heraklitsa, is the residence of the Kaimakam of the district.

There is a point similar in character to Heraklitsa Burnu immediately west of the village, but though shoal water extends off for some distance, it is not the scene of frequent wrecks, as is Heraklitsa Burnu. There are some mills nearly on the extremity of Myriophyto Point, which perhaps serve as beacons.

**Shoal.**—A shoal with a least depth of 3½ fathoms (6.4 m.) is reported to exist about 1 mile southwestward of Myriophyto and about 1,200 yards offshore.

**Elia Tepe.**—Two miles and a half from the coast, and equidistant from Myriophyto and Heraklitsa, is the remarkable peak of Elia Tepe, or Sterna Tepe, 2,255 feet (678.2 m.) in height. Though not so high as the Ganos Mountains to the eastward, the shape and comparative isolation of Elia Tepe make it conspicuous.

**Anchorage.**—Off Myriophyto is the best anchorage on this part of the coast. Holding ground is very fair, and the anchorage bank, in 6 to 14 fathoms (11.0 to 25.6 m.), is 800 yards wide, but the extremity of Myriophyto Point should not be brought to bear southward of 258°, as the shore bank of 2 and 3 fathoms (3.7 and 5.5 m.) is very steep-to.

**Hora,** 4 miles northeastward of Myriophyto, is a small village at the mouth of Kerasia Deresi, a deep ravine rising in Elia Tepe, which is dry in its normal condition, but the heavy thunderstorms frequent in this vicinity in summer and heavy rains in winter convert it in a few hours into a roaring flood. All the ravines in this neighborhood are of this character.

**Hora (Khoraz) Light.**—A group flashing white light, 164 feet (50.0 m.) above sea level, visible 19 miles, is exhibited from a white iron tower 67 feet (20.4 m.) high on the summit of South Cape, about ½ mile southwestward of the village. (See Light List.)

**Wreck.**—A sunken wreck lies about 800 yards eastward of Hora Lighthouse.

**Anchorage.**—There is fair anchorage off Hora in about 12 fathoms (21.9 m.) mud and sand, with the center of the village bearing about 335°, distant ½ mile.

**Ganos,** a village 2 miles north-northeastward from Hora, stands higher than the other villages on the coast, being mainly built on the steep sides and top of a spur about 100 feet (30.5 m.) above sea level, and is remarkable from this circumstance. Just northward some large ravines join as they reach the coast, and united have brought down when flooded a broad belt of sand and stones, which is conspicuous from the sea on account of its barrenness. There is a monastery close northward of it.

**Coast.**—From Heraklitsa to Ganos the coast, though backed by high hills (the lower spurs of which rise almost immediately from the water), is in no part cliffy, but northeastward of Ganos for 8 miles, to Koja Burnu, cliffs rise directly from the sea to heights varying from 200 to 900 feet (61.0 to 274.3 m.), and the summits of Ganos Daghlar, nearly 3,000 feet (914.4 m.) in height, approach to within 2½ miles of the sea. The coast is steep-to, with no anchorage worth mentioning, the water being deep fairly close in.

**Koja Burnu** is a fine bluff headland, without danger, from which the shore trends north-northeastward for 7½ miles to Rodosto.

At 1½ miles north of Koja Burnu, at the little village of Kumbagha, the high cliffy coast line ceases and the shore line is again comparatively low, with small cliffs occasionally. The country behind is well cultivated and has many villages.

**Panados Village,** with several mills close by, is situated on the coast at 3½ miles northeastward of Kumbagha, on the north side of a small stream taking its rise in Kainarji Tepe, 1,050 feet (320.0 m.) high, and 3½ miles north-northwest from its mouth.

There is anchorage all along this shore, but it is not good, and landing with the ordinary northeasterly winds is very difficult, especially between Panados and Rodosto, where a rocky ledge lies about 200 yards outside the beach and is an insurmountable obstacle to a boat.

**Rodosto Road** is a fair anchorage, but the ordinary winds from southeastward cause a tolerably heavy swell. In a very light breeze landing is difficult.

The water shoals very gradually, there being 5 fathoms (9.1 m.) 800 yards from the shore. The best berth will be in about 6 fathoms (11.0 m.) sand, with the large-domed mosque bearing about 350°.

**Wreck.**—The wreck of an iron raft lies sunk in 30 feet (9.1. m.) of water 218 yards from the extremity and in the line of prolongation of the jetty in the Bay of Rodosto. The highest part of the raft has over it a depth of 23 feet (7.0 m.).

**Rodosto Light** (*40° 58′ N., 27° 32′ E.*).—A flashing red light, 20 feet (6.1 m.) above sea level, visible 2 miles, is shown from a jetty at a point 30 yards from the outer end at Rodosto. (See Light List.)

**RODOSTO**, named by the Turks **Tekfurdagh**. has a population of about 42,000. It is built on the gentle slopes of a hill facing south and looks very imposing from the bay, with a sea front of nearly 1 mile and numerous trees interspersed among the buildings. The upper houses are 350 feet (106.7 m.) above sea level. The town is, however, poorly built, with no sanitary conveniences.

A group of houses with red roofs, conspicuous from seaward, is situated close to the shore at about 1½ miles southwestward of the town.

**Jetty.**—An iron jetty 879 feet long, 54 feet wide at the head, and 21 feet wide at the root, extends in a 185° direction from a point 109 yards eastward from the tower of the mosque at the eastern end of the village. There is a depth of 18 feet (5.5 m.) at the outer extremity.

**Supplies.**—Fresh provisions are obtainable, and water from fountain; 600 tons of coal usually in stock.

**Trade.**—Principal exports, grain; imports, general merchandise and petroleum.

**Communication.**—There is a telegraph station with connections to all countries. Daily mail service to Constantinople, which is about four hours distant to the northward by railroad. Steamer service to and from Constantinople three times a week.

The climate is said to be healthful.

**Coast.**—From Rodosto the coast trends about east by north, without sinuosities, for 10 miles, and then curves southeastward for 6 miles to Karga Burnu.

Low cliffs are the general characteristic of this part, from which the land rises very gradually to heights of about 600 feet (182.9 m.) 3½ miles back from the coast.

These hills are rounded downs, either cultivated with corn or covered with a small yellow prickly weed that can not be called grass, and are destitute of trees except in the valleys, which are for the most part wide and fertile. There are farms in a few places, and many ancient tumuli dot the country.

Many minor streams discharge along the coast, of which the Siman Dere and Köpruji Deresi are the largest, but apparently are of no use even for boats.

**Anchorage.**—There is excellent anchorage off the whole of this shore, the water shoaling gradually from 20 fathoms (36.6 m.) at 1½ miles to 5 fathoms (9.1 m.) at 400 yards. Eastward, in the bay between Köpruji Deresi and Karga Burnu, the 5-fathom (9.1 m.) curve is ¾ mile from the shore. The bottom varies between sand, shells and sand, and muddy sand inshore to mud in 15 fathoms (27.4 m.).

**Karga Burnu** (*40° 58′ N., 27° 53′ E.*), at the eastern end of some low, earthy cliffs, is a projecting spur 55 feet (16.8 m.) high, from which foul and rocky ground stretches off for more than 200 yards, with a steep edge. A very conspicuous tumulus, called Kurtnar Tepe, 310 feet (94.5 m.) high, lies 1¼ miles northeastward of Karga Burnu.

**Venedek Tash** is a rocky patch 1 foot (0.3 m.) above water, which lies 1 mile 112° from Karga Burnu and 700 yards from the shore.

From Karga Burnu to Eregli, 4 miles, the shore is mainly sandy beach backed by low, steep hills. Rocky, foul ground borders the coast for 400 yards, and off the south side of Eregli Peninsula, which is cliffy, a flat ledge of rock extends 80 yards. The Dokat Dere enters the sea eastward of Venedek Tash, in Kanli Liman; it is possibly available for small boats.

**Eregli Bay.**—Eregli Bay, situated northward of the peninsula, is a convenient anchorage in any winds but easterly, which bring in a short, choppy sea; the bottom is mud and sand. The ordinary northeast winds of summer draw nearly due east and come in very fresh. The remains of the ancient mole, which runs for 250 yards in a north-northwest direction from Adar Burnu, the southern point of the bay, is still of service in sheltering the inner part of the bay from the swell.

**Eregli (Heraclea) Light.**—A fixed white light, 164 feet (50.0 m.) above sea level, visible 15 miles, is shown from a white iron tower 34 feet (10.4 m.) high on the eastern part of Eregli Hill. (See Light List.)

**Anchorage.**—A small vessel can anchor in 6 fathoms (11.0 m.), with a large house to the north of the town bearing 278° and the extremity of Adar Burnu 129°. For a larger ship a berth with Adar Burnu bearing 168° and the house above mentioned 253°, in 8 fathoms (14.6 m.), mud, will be found convenient.

**Wreck.**—A wreck marked by a red buoy lies at the entrance to the port of Eregli in 9 fathoms (16.5 m.) of water.

**EREGLI (HERACLEA)**, a small village, stands on the site of the ancient city, of which innumerable fragments and foundations remain, on the northern slope of a small hilly peninsula and on the south shore of Eregli Bay.

**Pier.**—The only pier, which is at the customhouse, is 55 yards in length and has about 12 feet (3.7 m.) of water at its outer end.

**Communication.**—Telegraph station.

**Coast.**—Coming from either east or west along the shore, Eregli Hill makes as an island. The coast trends north-northeast from Eregli for about 3 miles, and then bends away gradually eastward and east-southeastward to Baba Burnu, which is 26 miles nearly due east of Eregli Lighthouse. Off the whole of the coast in the wide bay thus formed there is fair anchorage and good landing as a rule, but the summer northeast winds, which draw very much to the east when strong, roll enough surf on the beach westward of Silivri to make landing difficult except in little corners under the points, and with southerly winds landing is often dangerous.

The shore is mostly low, with sandy beach, with here and there cliffy points, and in many parts it is very shallow for some distance from the land.

The ground rises very gradually from the shore, treeless and to all appearances arid and uncultivated, but corn is grown in patches and might be raised in large quantities. Water is to be found almost anywhere by sinking wells. Round all the villages are fine prolific vineyards, especially in the neighborhood of Boghados.

The sky line from the sea, about 5 miles back on an average, is the smooth top of rounded downs 700 feet (213.4 m.) in height. Nine miles northeast of Eregli, and near Chantaköi village, is a somewhat conspicuous table hill 880 feet (268.2 m.) in height, on which the two large tumuli, Karaköi Tepe and Chanta Tepe, show well against the sky line. Northeast by north from Boghados the hills above Chatalja rise 1,030 feet (313.9 m.) above the sea and are the highest ground in this locality. There are many ancient tumuli in the neighborhood, especially round Eregli, some of which are very conspicuous from the sea from certain directions.

**Anchorage** can be found anywhere, as mentioned above, at about ½ mile from the land in 8 to 12 fathoms (14.6 to 21.9 m.); bottom sandy, with mud in depths over 10 fathoms (18.3 m.).

**Silivri** (*41° 04′ N., 28° 15′ E.*) is a small, dilapidated town built on the site of the old city on the eastern side of Silivri Bay, nearly midway between Eregli and Baba Burnu. It stands on the slopes of a hill which, immediately east of the town, presents precipitous earth cliffs 155 feet (47.2 m.) in height, which are very conspicuous from seaward. The old walls on the eastern side are conspicuous on the summit of these cliffs, as is the long bridge crossing the valley westward of the town.

**Anchorage.**—The best anchorage is in 8 fathoms (14.6 m.), mud, on a line between Kaba and Karga Burnu, the points of the bay, with the northern extremity of the town bearing about northeast. Protection is afforded to caiques by the remains of an old mole.

**Boghados**, Greek Epivates, is a small but somewhat thriving place on the shore 5½ miles eastward of Silivri; there is a caique harbor formed by a mole.

**Triklinos Rock.**—One-fourth of a mile eastward of the village and 400 yards from the beach is Triklinos Rock, with 4 feet (1.2 m.) of water on it; the ground westward inshore of this is all rocky and foul.

A rock lies 200 yards off the center of the town, near the edge of the 3-fathom (5.5 m.) curve.

**Anchorage.**—There is a good roadstead here, but care must be taken not to shoal the water under 5 fathoms (9.1 m.), as the edge of the bank is steep. Anchor in 7 to 9 fathoms (12.8 to 16.5 m.), with the tower bearing 8°.

**Baba Burnu**, 9 miles eastward of Boghados, is cliffy, with the conical hill of St. Elias immediately behind, and rocks and shoal water extend over 200 yards from the point.

**Buyuk Chekmeje Bay** (*40° 58′ N., 28° 34′ E.*).—Baba Burnu is the western limit of a large circular bay, named Buyuk Chekmeje (Great Bridge), which is about 2½ miles long, 2¼ miles wide, and affords excellent and safe anchorage in most seasons to vessels having good ground tackle. The entrance is open from south by east to southwest, from which quarter gales, excepting in some winters, are not frequent in the Sea of Marmara; but a considerable swell rolls in during these winds, which, though not endangering a well-found vessel, still makes the bay a rough berth. In a very heavy southwesterly gale, such as occasionally occurs, Buyuk Chekmeje can not be considered a safe anchorage, and vessels there should be prepared to leave it.

A reef extends nearly 800 yards from Mandatash Burnu (or Kaba Burun), the southeast point of the bay, to clear which keep the foot of a conspicuous peaked hill, named Azrathena (which rises to a height of 315 feet (96 m.) within the northwest corner of the bay), in range with the western extremity of the bridge (Four Bridges, as it is called), bearing 349°. The 3-fathom (5.5 m.) curve around the bay is from 300 to 400 yards off the eastern shore, which increases to about 800 yards off the western shore, as charted.

The depths decrease gradually from 20 fathoms (36.6 m.) water between the headlands of the bay to 5 and 6 fathoms (9.1 and 11 m.) at its upper part about ½ mile from the shore, the bottom throughout being stiff mud and good holding ground. In turning to windward do not stand toward either shore into less than 7 fathoms (12.8 m.) water.

There are two minarets in the village which are very conspicuous.

**Anchorage.**—The best anchorage is in 6 fathoms (11 m.), with the town of Kalikratia or Kalierachi, which stands on the west side of the bay, bearing 312°, distant 1,100 yards, and the southern minaret of Buyuk Chekmeje bearing 27°. This will keep the vessel clear of a broad bank or shoal having a depth of 3 fathoms (5.5 m.), which extends nearly 800 yards from the shore abreast of the cliffy point upon which the town of Kalikratia is built. Small knolls of ballast, having about 15 feet (4.6 m.) of water over them, rise from this bank.

**BUYUK CHEKMEJE** is situated at the head of the bay on the east side of the entrance to the lagoon, and Enasha village is situated on the eastern side at about ½ mile within the shore.

**Piers.**—There are three slight wooden piers extending from the village into 4½ feet (1.4 m.) water.

**Supplies.**—Grain, cattle, and forage are the chief produce. There is a fountain of good water on the beach at Kalikratia.

**Lagoon.**—Westward of the village of Buyuk Chekmeje is the channel which communicates with a large but shallow lagoon to the northward. The road from Constantinople to Rodosto crosses this channel by a bridge, conspicuous from the bay, known as Four Bridges, of ancient date, mentioned above; under the bridge there is 2 feet (0.6 m.) of water.

The lagoon is 4 miles in length in a north and south direction, and from 1 mile to ½ mile in width, with nowhere more than 5 feet (1.5 m.) of water. The northern end is lost in reeds and swamps, through which pass the Kara Su and Kug Dere, two small streams which flow down the broad Chatalja Valley. North of the bridge the entrance is closed by a fish weir, a gate in which affords entrance to caiques.

The railroad from Constantinople to Adrianople passes 1½ miles northward of the lagoon, but there is no station nearer than Chatalja, 4 miles farther northwest.

**Coast.**—From Mandatash Burnu to Ambarli village, 5½ miles, the coast is cliffy and fringed by shoal water and foul ground for 400 yards from the shore. There are several rocks nearly awash about 200 yards from the beach, and vessels should be cautious in approaching this shore, as the water shoals rapidly.

To the eastward of Deirmen Burnu are some white marl cliffs that are very conspicuous.

**Kuchuk Chekmeje Bay** (*40° 58′ N., 28° 46′ E.*), 8 miles eastward of Mandatash Burnu, is a slight indentation in the coast and affords no protection except during northeast winds. Northward of this isthmus across its head is a lagoon over 4 miles in length north and south, larger than that at Buyuk Chekmeje, with depths of 8 to 11 fathoms (14.6 to 20.1 m.) near its center, and doubtless at one time a valuable port. The entrance is now reduced to a narrow stream, up which a small boat may be dragged with difficulty.

The railroad from Adrianople skirts the eastern side of the lagoon and the coast to the eastward, with Kuchuk Chekmeje village near the southeastern corner of the lagoon.

**Landmark.**—The Russian military monument, which stands about ½ mile from the shore to the eastward of the village, is a conspicuous mark from seaward, as is also a large building at 1,400 yards northeastward of the monument.

**Anchorage.**—There is fair anchorage in Kuchuk Chekmeje Bay. A berth in 12 fathoms (21.9 m.), with the Floria Station bearing about 42°, is about the best. There is no landing in southerly winds.

**San Stefano Point,** 3 miles southeast of Kuchuk Chekmeje and 7 miles from the entrance of the Bosporus, is a red cliff 50 feet (15.2 m.) in height.

**San Stefano village,** the most distant suburb of Constantinople to the westward, stands on the western part of the cliff and is mostly composed of brightly colored houses. There is daily rail and steamer service to Constantinople.

**San Stefano Point Light.**—A fixed and flashing white light, 75 feet (22.9 m.) above sea level, visible 14 miles, is exhibited from a white stone tower 63 feet (19.2 m.) high, about ½ mile east of San Stefano. (See Light List.)

**San Stefano Shoal.**—Vessels bound to the Bosporus generally close the land about San Stefano Point, and in their anxiety to keep out of the current setting out of the Bosporus, which, however, does not pass within 3 miles of San Stefano Point, not infrequently hug the shore so much as to ground on the sand bank which extends ½ mile southeastward of San Stefano Point Lighthouse. From the outer edge, where there is 5 fathoms (9.1 m.), this bank shoals gradually to the shore. The 3-fathom (5.5 m.) curve is about 800 yards from the point.

**Directions.**—The western tower of the Selimiye Barracks (a huge yellowish building with a tower at each angle standing on the Skutari shore) in range with the northern and highest summit of Mount Bulghurlu (called Buyuk Chamlija Tepe), 850 feet (259.0 m.) high, 64°, leads southward of San Stefano Shoal in about 6 fathoms (11.0 m.).

**Makriköi.**—The coast forms a bay eastward of San Stefano Point, and on the eastern side of this and 2 miles northeastward of the lighthouse is Makriköi, a suburb of Constantinople. Close to Makriköi on the west are the Government powder mills of Zeitunlik.

**Wreck.**—A sunken wreck lies about ½ mile east-southeastward of Makriköi Pier head.

**Buoy.**—A buoy with a spherical top mark marks this wreck.

**Marmara Tower.**—Four miles east-northeastward of San Stefano Point the southwestern angle of Constantinople is reached, where the old sea and land walls join at the Marmara Tower, a square building on the seashore. Immediately northeastward are the variously shaped towers of the old castle, known as Yedi Kule or Seven Towers, at which there is a railroad station. The sea walls of Seraglio Point are 3 miles in length within which runs the railroad.

Eastward of San Stefano Shoal, as far as the Marmara Tower, the shore bank extends off for 500 yards, diminishing its distance up to Seraglio Point, where it again stretches seaward for 600 yards.

**Anchorage.**—From San Stefano Point to Seraglio Point there is good anchorage in 7 to 13 fathoms (12.8 to 23.8 m.). Off Makriköi and the western part of this anchorage the deeper water is the better holding ground; near Seraglio Point and under the eastern part of the south walls of the city, where sailing vessels usually anchor while awaiting a fair wind to enter the Bosporus, depths of 12 fathoms (21.9 m.) and a mud bottom will be found at 600 yards offshore. Vessels can lie closer in.

All this anchorage is exposed during southerly or westerly winds, but as it is generally used only as a temporary stopping place it does not matter so much, every vessel taking advantage of the first breath of south wind to move into the Bosporus. No loading or unloading takes place on the south coast of Constantinople except from the local caiques that bring wood or provisions from the shores of the Sea of Marmara.

**Seraglio Point** (*41° 00′ N., 28° 59′ E.*) is surrounded by a mud bank which deepens gradually from 3 feet (0.9 m.) to 5 fathoms (9.1 m.) about 400 yards to the southeastward and forms a rounded extremity; the bank thence gradually approaches the shore northward, which it skirts as far as Old Seraglio Point. Seraglio Bank, with depths of 5 to 10 fathoms (9.1 to 18.3 m.) extends 1,400 yards southward of the point.

**Caution.**—Vessels rounding Seraglio Point should give the 6-fathom (11.0 m.) curve of Seraglio Bank a wide berth and should on no account attempt to cross it. A vessel will be to the eastward of the bank when the palace of Dolma Bagche is well open eastward of the walls of the Old Seraglio.

The masts and funnel of the wreck (1910) near the southern end of this bank, which were formerly showing above water, are no longer visible.

The range line, the western tower of Selimiye Barracks in range with Buyuk Chamlija Tepe, is no longer to be used in regard to

Seraglio Bank, as an obstruction is reported to exist in the vicinity; this range line is only to be used for clearing San Stefano Shoal.

**Anchorage.**—There is a good anchorage near the southwestern edge of the bank which surrounds Seraglio Point, but in order to be sheltered from the strength of the current, which sets along its eastern side, a vessel should anchor with Leander Tower in range with the eastern extremity of Seraglio Point and never open that tower eastward of it, as the current would make it difficult to get under way from a berth eastward of that bearing.

**Buoy.**—A conical buoy painted green and marking a wreck is moored 1,980 yards 197° from Seraglio Point Lighthouse and about 300 yards southward from the charted position of the wreck.

**ASIATIC SHORE—Fanus Hill to Cape Yuriji.**—From Fanus Hill, described in the previous chapter, the Asiatic shore of the sea of Marmara is low. The small river Bairam Dere, draining the valley of the same name, falls into the sea 600 yards eastward of the hill. Farther on the hills on the east side of the Bairam Dere approach the sea and show cliffs of about 220 feet (67.1 m.) in height. Beyond the cliffs the coast, alternately low or cliffy, continues its easterly direction for 5 miles to Cape Yuriji; the hills, rising higher and higher in the interior, are moderately wooded.

Several shoals of 14 to 16 feet (4.3 to 4.9 m.), rock and sand, lie off the mouth of the Kara Dere as charted.

There is a small pier just northeastward of the mouth of the stream.

**Cape Yuriji or Boz Burnu** (*40° 24′ N., 26° 55′ E.*) is a triple point about 70 feet (21.3 m.) in height. A shoal of 18 feet (5.5 m.), about 400 yards in extent in a northeasterly and southwesterly direction, named Boz Bank, lies nearly 1 mile 289° from the eastern part of the cape. The summit of Akyarlar Dagh, on the Gallipoli Peninsula, just open northward of the old lighthouse tower on Fanus Hill, bearing 264° leads northward of this shoal and of the others that lie to the westward.

**Yuriji Liman.**—Eastward of Cape Yuriji the coast trends southeast for 2½ miles, then east for 3½ miles, thence north-northeast 2 miles to Kamir or Kamaraes, and forms a large bay named Yuriji. Immediately beyond Cape Yuriji the shore is straight, flat, and sandy, the hills standing a little distance from the coast, but at the east end of this sandy shore the hills are close to the coast and present precipitous cliffs of varied heights diversified by little sandy coves. From the sea wooded hills appear to rise one over the other with pleasing variety, the valleys are cultivated and rich in flocks and herds, and this character of coast is maintained to Kamir.

There are no dangers in Yuriji Liman, the coast being generally steep-to, with the exception of a few rocky islets lying near the shore in some places. There is no good anchorage in the bay, the prevailing northeasterly wind blowing directly on the coast, while the holding ground is bad.

**Yuriji.**—This large village is situated 1¾ miles from the coast in a fertile valley, the produce of which is brought down to one of the little sandy coves above mentioned, named Keresli Iskalesi, from which a large quantity of charcoal is shipped.

**Kamir (Kamaraes) Liman.**—At the northeastern extremity of Yuriji Liman is Kamir Liman, a sandy bay about 1 mile across formed by the curving of the coast line to the north-northwest and terminating in Tarsana Burnu. Kamir Liman affords protection from northeast winds.

The part of the bay to the north of the town is still called the Arsenal, though no trace exists of any buildings. Fine Hellenic walls of white marble may be traced for a great distance, probably the ruins of the encircling walls of the old town. A theater can also be seen on the hillside facing the northeast, below the mill on the point. Heaps of stones, fragments of Roman walls, and underground passages abound in the valley to the east of the present town. Half a mile up the Kamir Valley two arches span it. The ruins of Parium may be seen on the other side of the hill behind the town.

**Wreck.**—The wreck of a sailing vessel lies about 600 yards 290° from the minaret of the mosque of Kamir.

**Kamir Chai.**—The Kamir Chai empties itself in the center of Kamir Liman: its lower course named Chanakli Boghaz. In the winter the flat land round its mouth is generally under water, but in summer exhalations from this plain cause much malaria and sickness in the town. The river, which drains the large plains of Kamir Ovasi, is of considerable depth and width for many miles and never ceases flowing: in summer a dry bar forms across its mouth through which the water filters to the sea.

**Anchorage.**—Good anchorage may be found in Kamir Liman 500 yards from the shore in 12 fathoms (21.9 m.) mud, with the extremity of Tarsana Burnu bearing north and Kamir minaret 138°. The anchorage is well protected by the land northward and eastward, but is open to westerly winds.

From the point under the conspicuous mill to the left of the town the remains of an old mole run out under water and must be avoided.

**KAMIR** (*40° 25′ N., 27° 04′ E.*).—This town, named Kamaraes by the Greeks, is situated on the shore of the bay and has a population of about 3,000 inhabitants. It is on the right bank of the river under a high cliff that stands a short distance back from the coast, and possesses one mosque, situated on the beach.

**Supplies.**—Water obtainable from a fountain in the town; not considered good. Local produce obtainable.

**Trade.**—Charcoal, grain, vegetables, and livestock exported to Constantinople.

**Communication.**—Telegraph to all parts.

**Tarsana Burnu,** a white rocky point 25 feet (7.6 m.) high extending to the northwest, forms the termination of Kamir Liman The coast line beyond trends eastward for ½ mile, and then turning northeast continues generally in the latter direction for about 2½ miles, forming several sandy bays with rocky points and cliffs between.

**Tuzli Islet,** situated 2 miles northeastward of Tarsana Burnu and 500 yards from the nearest part of the shore, is 125 feet (38.1 m.) high and composed entirely of white marble. The islet is steep-to and there are 6 to 7 fathoms (11.0 to 12.8 m.) between it and the shore.

**Yumurta Islet.**—Eastward of Tuzli Islet the coast forms a shallow bay to another point 1 mile distant. Off this point lies Yumurta Islet, 120 feet (36.6 m.) high and, like Tuzli, formed of marble, but its appearance is not so white as the latter. Yumurta is connected with the land by a submarine ridge having just enough water for a boat to pass over. A ridge of 5 fathoms (9.1 m.) extends 400 yards northward from the islet.

**Anchorage.**—A vessel can anchor between Tuzli and Yumurta Islets, close to the latter in 13 fathoms (23.8 m.), opposite a small valley in which two mills in Deirmenjik are visible. In this berth Aksas Burnu will appear just to the southward of Yumurta Islet. The anchorage affords protection from east winds.

**Coast.**—Beyond Yumurta the coast extends east 1½ miles to Aksaz Burnu, forming a shallow bay between, broken up into sandy beaches and cliffy points. Between Tarsana Burnu and Aksaz Burnu it is free from danger and deep water will be found 400 yards from the shore, the 5-fathom (9.1 m.) ridge north of Yumurta Islet excepted.

**Shekh Melik Liman.**—From Aksaz Burnu, a cliffy, bold headland, the coast trends southeastward for 2½ miles to a small bay called Shekh Melik Liman, where anchorage in about 13 fathoms (23.8 m.) can be found and protected landing in its eastern part, but the northeast wind brings a good deal of swell into the anchorage. Behind Shekh Melik Liman the country is hilly and uncultivated, with a good deal of brushwood cover.

The little village of Aksaz stands on the sandy beach to the westward of Shekh Melik Liman.

**Kara Burnu** (*40° 28′ N., 27° 17′ E.*) is a fine headland 6 miles eastward of Aksaz Burnu. A few rocks above water that lie 100 yards northeast of the point are steep-to; the cape is otherwise clean. Between Kara Burnu and Shekh Melik Liman the shore is cliffy and steep.

**Kale Burnu** is 4½ miles south-southeastward of Kara Burnu, the coast between being high and cliffy. It is 50 feet (15.2 m.) in height and is the sharp termination of the promontory forming Karabigha Bay. Excepting some rocks awash 50 yards from the shore the point is clean.

**Karabigha Bay.**—From Kale Burnu the coast runs back westward for 1½ miles, and then turning south and southeast forms Karabigha Bay.

West of the peninsula, which is edged by a low cliff, the shores of the bay are nearly all sandy beach. Chal Tepe, a rounded hill with a double summit, stands about ⅓ mile from the beach on the western side, leaving a narrow strip of flat ground between the foot and the sea and forming the northern boundary of the great plain of Bigha, down which flows the Bigha Chai.

Running from sea to sea across the root of the peninsula are the decaying remains of some fine Byzantine walls, the ruined towers on which are very conspicuous from the sea. Low walls can also be traced round the whole peninsula, and the remains of an ancient mole, forming a galley port, are nearly awash off the middle of its southern shore.

**Anchorage.**—There is good anchorage and holding ground all over Karabigha Bay, but it is open to the northeast and east. There is, however, a little protection to be got by anchoring well up in the northwest corner of the bay in 6 fathoms (11 m.), with the ruined towers on the peninsula bearing 40° and the small rock 100 yards from the shore east of the pier 275°. The northeasterly gales in Artaki Gulf are generally from about north-northeast, but locally in Karabigha Bay draw more to the eastward and bring in no swell to endanger a vessel.

If desirous to get as near to the village as possible, bring the houses on the beach to bear 303° and anchor in a convenient depth on that bearing, which leads south of the shoal bank.

In smooth weather boats can be beached on the sand at the western part of the bay, as there is 1 fathom (1.8 m.) of water close to the shore. Landing can be obtained in strong northeast winds just westward of the ruins on Kale Burnu.

**Shoals.**—About ⅓ mile northeastward of the town pier and off a low cliffy point a shoal bank of rock and sand extends for 500 yards, on which there is a rock 3 feet (0.9 m.) above water 100 yards from the shore.

A shoal with a depth of 15 feet (4.6 m.) over it lies 400 yards 98° from the pierhead. A red buoy (provisional) marks the shoal.

**KARABIGHA (KARABOGHA).**—This village stands about ¼ mile back from the beach at the northwest part of the bay and is the port of Biga Shehir, which lies inland on the stream of the same name 13 miles to the southwestward.

**Pier.**—It has a wooden pier with 8 feet (2.4 m.) of water alongside its head.
**Trade.**—Corn, cattle, sheep, and wood are shipped to Constantinople.
**Communication.**—Weekly steamer service to Constantinople during summer.

**Gulf of Artaki,** formed by the projection of the land about Kara Burnu on the west and the peninsula of Artaki on the east, is also protected by the Pasha Liman group. It extends 25 miles from east to west and has nowhere a greater depth than 30 fathoms (54.9 m.). The south shore is mostly uninhabited and uncultivated, and the prevailing northeast winds make the land difficult. There is but little trade, and this coast is therefore unfrequented except by sportsmen, who come to seek wild fowl in the numerous marshes.

The Biga Chai and Göne Chai, which empty into the gulf, might both be made navigable for boats for some distance, but unassisted by locks they are too much obstructed by shallows in summer for the lightest craft to pass.

From Karabigha to Musacha, a distance of 17 miles, the shore is low, the hills rising at some distance from the coast; more to the eastward it is cliffy and steep.

There is anchorage all along this shore in 7 to 15 fathoms (12.8 to 27.4 m.), sand, changing to mud in the deeper water, observing that the shore flat, with depths under 3 fathoms (5.5 m.), extends about ½ mile off Tahir Ova.

**Biga Chai** empties 2¾ miles southward of Kale Burnu. In winter and spring it sends a large amount of water into the sea, but in the summer the mouth is almost closed by a bank on which there is a depth of only a few inches and which is therefore impassable for a ship's boat; above the bar boats can ascend 2 or 3 miles.

**Göne Chai** joins the sea 14 miles eastwarl of Kale Burnu. Contrary to the Biga, it has pushed forward its delta into the sea and formed an extensive bank off the coast. The actual mouth evidently has varied much, as several lagoons which are now quite unconnected with the river show unmistakable signs of having once been branches of it. Though not as large as the Biga, it could still be easily made of service by a little expenditure if necessary for the development of trade.

The numerous swamps in the plain round its mouth (called Tahir Ova) swarm with wild fowl in the winter, and game of all kinds is to be found in the vicinity.

Musacha is a small village on the shore 2½ miles eastward of the mouth of the river.

**Sand bank.**—The bank off the delta of the Göne Chai extends from the shore on the western side for 1,600 yards and is very steep on its outer edge. When approaching it with a view to anchoring care is therefore requisite. To the eastward of the mouth, however, it only stretches offshore for 900 yards.

**Mal Dere Burnu** (*40° 19′ N., 27° 43′ E.*) is a bold, cliffy point 5 miles eastward of the Göne Chai.

**ARTAKI PENINSULA,** named Kapu Dagh by the Turks, is a mountainous mass 16 miles from east to west and 8 miles from north to south joined to the mainland by a low and short isthmus 1 mile in width, but originally an island separated by a narrow and probably shallow channel.

The higher mountains, which culminate in the sharp peak of Adam Kaya, 2,620 feet (798.6 m.) high, are on their northern sides covered with low oak trees and are the source of many streams which never fail in supplying water to the numerous cultivated spots in the lower parts of the valleys. These are all very fertile, well covered with vines and olives on the southern side of the mountains, and with garden produce in the northern valleys. Villages are scattered round the shore of the peninsula, Erdek or Artaki, situated on the southwest point, being the chief town.

Of the two great bays formed on either side of the isthmus the western one, Artaki Bay, is the most useful as an anchorage, as the northeasterly winds blow home strong into Perama Bay, the eastern one, at all seasons.

The north side of the peninsula, although steep, is nowhere so steep-to as to prevent a ship from anchoring if drifted in during a calm, and numerous sandy bays afford good holding ground in ordinary breezes.

**Artaki Bay** (*40° 22′ N., 27° 49′ E.*), on the western side of the isthmus connecting the peninsula to the mainland, is 3 miles across at the entrance from Topchu Burnu to Murad Bair and 4 miles from east to west.

It is a capacious anchorage and, excepting in southwesterly winds, smooth in all weathers. Holding ground is very good everywhere, especially in the deeper water at the northwest portion. Southwesterly winter gales are ordinarily rare, but when they do occur they are heavy. They give, however, ample warning by a fall of the barometer and threatening appearance of the sky to the southward.

Southwest of Murad Bair, and separated by a navigable channel ½ mile wide, is the rocky and desert island of Tovshan Adasi.

By anchoring to southeastward of Murad Bair communication is easy with Erdek town; but for a single ship the anchorage off the town itself is preferable for this purpose.

The land on both sides of Artaki Bay is high. On the southern shore the hills rise at once from the beach, but on the peninsula there is a stretch of flat land between the foot of the mountains and the bay which is well cultivated with vines and olives.

The ancient Cyzicus stood on the flat land and ends on the spurs adjoining the isthmus. Though once very large and richly adorned with marble and stone temples and public edifices, but little now remains. All the larger blocks of marble have been from time to time carried off to aid in building Constantinople, and the fragments of smaller size have been collected into thick walls which divide from one another the fields and vineyards with which the site of the old town is completely covered. There are, however, considerable portions of the amphitheater left standing which was built across a valley 1 mile from the sea. Parts of the walls that faced the isthmus also remain.

The isthmus is mostly swampy on its western side, and on the eastern side are low, bare, sand hills.

**Landmarks.**—The following marks in Artaki Bay are conspicuous: The northwestern minaret in Aidinjik; two windmills close together on the 850-foot (259.1 m.) summit about 1,000 yards northeastward of Aidinjik; a white square building with red roof at the inner end of the small pier at Aidinjik Iskalesi; the largest cypress tree situated at the northwestern end of the snipe marsh at the head of the bay; and a stone tower close northeastward of the amphitheater northward of the head of the bay.

**Aidinjik,** a large Turkish village about ⅔ mile back from the south shore, is picturesquely placed on a dip between the hills which divide the seacoast from the elevated plain of Manias Göl, and with its minarets is very conspicuous from Artaki Bay.

**Murad Bair (Ag. Simeone),** on the point forming the northwest termination of Artaki Bay, is very conspicuous in approaching from west or north, being 340 feet (103.6 m.) in height and cone shaped. It has a curious crust of marble overlying other rock. The remains of heavy walls and towers still exist on the northeastern or land side.

**Tovshan Adasi (Piganusa),** a small, rocky, and arid island ¾ mile southwestward of Murad Bair, 150 feet (45.7 m.) in height, is steep-to on all sides.

**Simeone Channel,** separating Tovshan Adasi from Murad Bair, is nearly ½ mile in width with a fairway depth of 17 to 19 fathoms (31.1 to 34.7 m.) of water, except in one spot nearly on the line joining the summits of Murad Bair and Tovshan Adasi and 300 yards distant from the shore of the former, where there is a rocky patch of 3½ fathoms (6.4 m.). In passing through this channel a vessel must, therefore, favor the island side, which is quite steep-to and clear.

**ERDEK (ARTAKI).**—This village stands at the northern point of a small sandy bay just to the northward of Murad Bair and occupies the site of the old town of Artace. There are several mosques with conspicuous minarets. Population about 5,000.

**Supplies** are abundant.

**Communication.**—There is steamer service once a week and telegraph connection with Constantinople.

**Zeitin Ada,** a small rocky island lying 270 yards from the shore at Erdek town, is covered with old foundations and has the remains of an old mole extending from its northern point. From the mainland point the ruins of another mole stretch out for 120 yards toward Zeitin Ada. Between these two is a channel 150 yards wide with 2 fathoms (3.7 m.) of water, used by native craft.

**Three-fathom Rock.**—Five hundred yards southwestward of Zeitin Ada is a small rocky patch of 3 fathoms (5.5 m.) with deep water around it.

**Anchorage.**—There is a good anchorage in the bay between Zeitin Ada and Murad Bair, both of which are steep-to. Anchor in 10 fathoms (18.3 m.) with the south point of Zeitin Ada bearing 306° and a tall chimney in the center of the bay 84°.

**Coast.**—From Erdek the coast trends to the northwestward for 7 miles to Mutha Point. To Korakhia Burnu, 3 miles from Erdek, it is low and sandy, an extensive plain intervening between it and the foot of the hills; but Korakhia Burnu itself is steep and cliffy, being the termination of a rounded hill called Panar Tepe, and from here to Rhodia mountains rise directly from the sea.

There is good holding ground in 16 to 20 fathoms (29.3 to 36.6 m.) 1 mile offshore between Erdek and Korakhia Burnu.

**Gonia Bay,** from the shore of which rise the steep sides of Mount Klapsi, 2,530 feet (771.1 m.) high, is on the north side of Panar Tepe. It has a considerable area of anchorage ground in from 8 to 17 fathoms (14.6 to 31.1 m.), but in northeasterly winds heavy squalls come down the ravines occasionally even when there is but a moderate breeze on the north side of the peninsula. The village is very small, with a little flat land around it.

**Rhodia Channel,** between the western part of Artaki Peninsula and the island of Pasha Liman, affords access to Artaki Bay from the north. It is a little over 1 mile wide at its narrowest part and free from all dangers, with the exception of a sand shoal that runs off from Mutha Point for 400 yards.

There is anchorage everywhere in the channel, which is nowhere deeper than 20 fathoms (36.6 m.). The depths in the northern part of this channel were reported in 1920 to be less than shown on the charts. The current has been observed to run through this channel at a maximum rate of 2½ knots (presumably to the southward).

**Mutha Point** (*40° 29′ N., 20° 41′ E.*), on which Rhodia village stands, is a low, sandy spit difficult to see at night. Off it, as before mentioned, stretches a shoal with 5 fathoms (9.1 m.) 400 yards. Excellent water, brought down from the mountains, can be obtained from a mill at Rhodia.

There is fair anchorage south of Rhodia village in about 16 fathoms (29.3 m.) water, but by far the best anchorage is 1 mile to the northward in Palios Bay.

**Palios Bay** has excellent holding ground and is well protected from the northeast. The best spot for anchoring is midway between Palios and Glaromiti Points in 12 fathoms (21.9 m.).

**Palios (Palio) Point Light.**—Two fixed red lights, 131 feet (39.9 m.) above sea level, visible 6 miles, is exhibited from a mast 36 feet (11.0 m.) high on a white house located on the west point of Artaki Peninsula. (See Light List.)

**Harakhi Point,** also bold and high, is the northwestern point of Artaki Peninsula and ½ mile north of the lighthouse on Palios Point. A rocky shoal extends to the westward 200 yards, and on the rocky spit extending northward of the point is a rock 10 feet (3.0 m.) high.

From here the coast trends northeastward 2 miles and is bordered by rocks and shoal ground.

**Likos Rock,** 400 yards from the shore 1 mile northeast of Harakhi Point, has only 4 feet (1.2 m.) of water on it and does not generally show. There is shoal water 200 yards outside the rock. When turning to windward, by tacking before the summit of the peninsula of Hukhlia in Pasha Liman Island disappears over Harakhi Point, a vessel will be clear of the rock.

**Khalko** is a small island 120 feet (36.6 m.) high laying 600 yards from the Artaki shore and 1¾ miles from Harakhi Point. There are several rocks around it, but all are above water. The channel inside Khalko is obstructed by patches of 2 fathoms (3.7 m.).

**Favlimi Bay** is too open to the northeast to be of much use as an anchorage. Its eastern side is shoal.

**Drakonda Bay,** 1½ miles east of Khalko and separated from Favlimi Bay by a narrow mountain spur, is the best anchorage on the north side of the peninsula. It is a square bay ½ mile long by a little less wide, and is open to the north; the eastern shore, however, curves round so as to give protection against northeasterly winds to a vessel anchoring in 13 fathoms (23.8 m.) mud, with the eastern extremity of the bay 12° and the few houses in the southeast corner of the bay bearing 115°. Drakonda village lies up the valley, the lower part of which is well cultivated.

**Vathi Liman,** 2 miles east of Drakonda, is a rectangular-shaped inlet ¾ mile in each direction and open to the northeastward. The village, which is small, is in the southwest part of the bay.

Its shores are steep, with no dangers, and the spurs that form its sides dip precipitously to the sea. Inside the line of the points there is good holding ground anywhere in 10 to 20 fathoms (18.3 to 36.6

m.), but the best berth is toward the southeast corner in 14 fathoms (25.6 m.), muddy sand, with the chapel on a spur north of the village bearing 250°, but with a northeasterly wind of any strength there will be some sea here, and despite its superior size Vathi is not such a good anchorage as Drakonda.

From the sandy beach at the head of the bay a fertile valley, nearly flat, runs back ¾ mile, but is surrounded by abrupt spurs of the mountains.

**Coast.**—From Vathi Liman the coast, which is very picturesque, the mountains being of good shape and covered with trees and bushes, trends eastward for 11 miles, cliffy and steep, with the mountain spurs rising abruptly from the water. There are many small sandy bays, but none of sufficient depth to give any protection to a large vessel; in the eastern corners boats can land and caiques obtain shelter. A ship can anchor nearly anywhere in 12 to 20 fathoms (21.9 to 36.6 m.) between 250 yards and ¼ mile from the shore, bottom varying between mud, sand, and gravel; the deeper water the better holding ground.

**Kapsala Burnu** (*40° 29′ N., 28° 02′ E.*), the eastern point of the Artaki Peninsula, is cliffy and has a rocky ledge running off northeastward 400 yards.

**Coast.**—From Kapsala Burnu the shore trends south-southwestward for 1½ miles to Moda Burnu, and then turns southwestward into Perama Bay.

**PASHA LIMAN (ALONI) GROUP** consists of four islands lying west of Artaki Peninsula. The surfaces of all of them are very broken and their shores rocky, except in the bays, which have sandy beaches.

**Pasha Liman**, the largest and easternmost, possesses an excellent harbor and is well cultivated with vines. The other islands are only cultivated in the vicinity of their little villages and are otherwise covered with grass or scanty bush.

**Kutali Road**, between Kutali and Arablar Islands, is a good anchorage in northerly winds and much frequented during the winter by sailing vessels waiting for a change to get eastward.

**Pasha Liman (Aloni)** is separated from Artaki Peninsula by Rhodia Channel. Its shape is irregular, and the southeastern portion, where the village of Hukhlia is located, forms a peninsula only connected to the main island by a narrow and low isthmus. The length of the island is, from northwest to southeast, 5 miles and its breadth 3¾ miles. The surface is very varied; the hills are mostly rounded, and at the northern extremity the symmetrically conical hill of Mount Ag. Elias, 700 feet (213.3 m.) high, is very conspicuous from all sides; it is also the highest point of the group. On the Alichi Isthmus are some disused salt pans.

There are several small islands lying off the shores of Pasha Liman, of which Koyun Adası, the largest, forms, with a deep indentation into the main island, the secure port of Pasha Liman Harbor, and anchorage is to be had in any of the bays in the island, but the available holding ground is not good.

There are five villages on Pasha Liman, all small and unimportant. Wine is the principal production, and the larger part of the island is covered with vines. Excepting a few olives, there is not a tree on the island.

A steamer from Constantinople is supposed to call at Pasha Liman once a week on her way to Erdek, but during the winter the island is sometimes weeks without any communication with the metropolis.

**PASHA LIMAN HARBOR** is secure from all winds and has sufficient room for a squadron, the anchorage ground being 1½ miles long by ½ mile wide, with moderate and fairly uniform depth, about 8 to 12 fathoms (14.6 to 21.9 m.), and a good holding mud bottom. Entrance is easy from the north and not difficult with a fair wind from the west.

With a southwesterly gale a little swell will come in through the west pass which will affect vessels in that line, but not to any great extent.

**Cape Kukumar** (*40° 31′ N., 27° 36′ E.*), the northwest point of Pasha Liman, is a bold headland to look at but has a rocky ledge extending over 400 yards from it. From this southward the bank on the eastern side of the harbor is narrow and follows the shore up to the town, where it turns across and fills up all the head of the harbor to a distance of ⅓ mile offshore.

**Glaromiti Point,** the southwestern point of the harbor, is low and has shoal water extending from it for over 400 yards.

**Middle Ground** is a shoal patch 300 yards in length with only 9 feet (2.7 m.) on it. It lies on the line between Glaromiti Point and Pasha Liman village, ½ mile from the former, and through it partly spoils the harbor, it protects vessels lying in the southern part of it from the swell which enters during a southwesterly gale. It does not show and must be carefully avoided in picking up a berth.

**Fairway Patch,** a small rocky patch with 18 feet (5.5 m.) water on it, in West Pass midway between Glaromiti Point and South Center Island, greatly spoils that entrance, being situated in the middle of the channel and generally not visible. Vessels must pass southward of the bank; the range is given hereafter, but is not easily made out.

**Koyun (Kuyus) Adasi,** which forms the northwestern side of Pasha Liman Harbor, is a narrow, rocky island covered with grass. It is 2 miles in length north and south, including the islet of Mamala, 130 feet (39.6 m.) high, which lies to the north, and is only separated by a shallow opening a few yards wide. The rounded hillocks which crown its ridge rise to 415 feet (126.5 m.) at the north end and 295 feet (89.9 m.) at the south. The latter hill is covered with large white erratic bowlders looking like a flock of sheep.

There is a narrow, rocky ledge all round the island, which widens off the southern end into a very shallow bank extending nearly 600 yards to the south into West Pass and 800 yards to the east into the harbor; it is steep on all sides and can generally be seen, but has patches of only 6 feet (1.8 m.) in many places.

**Center Islands** (*40° 30′ N., 27° 35′ E.*) are two small flat-topped islets standing on the eastern edge of the last-mentioned bank. The southern and largest, 50 feet (15.2 m.) high, is useful as a leading mark on entering the harbor from the north.

**Directions.—North Pass** is clear of danger with the exception of the rocky ledge extending from Cape Kukumar, Pasha Liman Island.

To enter by this channel bring the west peak of Pasha Liman, a well-defined hill 380 feet (115.8 m.) in height, in range with the eastern edge of South Center Island bearing 187°. This will lead in mid-channel, and when Cape Kukumar bears 76° steer 172° for the windmill standing on the beach just west of Aloni village and anchor as convenient.

**West Pass** is narrow and encumbered by Fairway Patch, but a depth of 7 fathoms (12.8 m.) can be carried in by attention to the marks. In using this entrance bring the western high house in Pasha Liman village in range with a ruined mill on the ridge behind the town, bearing 79°. This will lead midway between Fairway Patch and the shoal water extending from Glaromiti Point, and when North Center Island is open clear to the east of the south one steer as convenient for an anchorage.

In consequence of the construction of several houses to the northward of Pasha Liman village the range marks for West Pass have become difficult to distinguish.

**Panagia,** a small island 115 feet (35.0 m.) high with a smooth grassy top, lying 800 yards to the westward of the southwest point of Pasha Liman, is surrounded by a shallow bank in most directions for about 300 yards, but its western or seaward point is steep-to. A shoal bank also connects it with a small islet 30 feet (9.1 m.) high which lies 600 yards southward of the south point.

The channel between Panagia and Argero Point, nearly 600 yards wide, has a least depth of 7 fathoms (12.8 m.) in the fairway and is navigable. Shoal water extends about 150 yards from the points on either side, but it is otherwise clear and steep.

**Arablar Channel,** between Arablar and Pasha Liman Islands, is 1 mile wide at its narrowest part and perfectly clear. At the north end the points are steep-to, but off the southwestern point of Kuyus Adasi and off Yalipliman Point in Arablar the 5-fathom (9.1 m.) curve extends 400 yards.

**Arablar (Aphisia) Island** is about the same size as Pasha Liman. Its surface is very broken, hills craggy and bare, and cultivation only exists in a few of the valleys and near the villages of Arablar on the east coast and Aphisia on the west coast, both poor, but the latter is the better of the two. Nearly half of the former village is in ruins.

There is no harbor in Arablar Island, and though protection may be found from northeast winds off Aphisia, a better and in many respects handier anchorage will be obtained in Kutali Road, northward of it.

**Shoals.**—The shores of Arablar are generally rocky, with foul and shoal ground extending 100 to 300 yards, but on the northern side this stretches farther.

Off a small point on the north coast midway between Voli Point and Marmara Point the shallow water extends 375 yards to the northeast, with a small islet 15 feet (4.6 m.) high on it, and farther to the northeast, 800 yards from the shore, is a rocky patch with only 24 feet (7.3 m.) water, surrounded by depths of 9 fathoms (16.5 m.).

Between Voli Point and Aphisia village the 3-fathom (5.5 m.) curve is about 800 yards off.

**Roun Rock** (*40° 31′ N., 27° 29′ E.*), a small rocky islet 20 feet (6.1 m.) high in the southern part of the channel between Arablar and Kutali, is connected to the Arablar shore by a 9-fathom (16.5 m.) bank, which stretches off from the low sandy point north of Afisia village on which there is a conspicuous mill. It is situated 1 mile from Arablar and 1¼ miles to the northward of Panjar Point, and is sounded by a rocky shoal which extends 400 yards northeast and 100 yards northwest, or on the passage side.

Seven hundred yards to the northeast is a rocky patch of 24 feet (7.3 m.), but as this lies in the direction of the north point of Arablar it is no obstruction to navigation.

**Kutali Road Light.**—A flashing white light, 49 feet (14.9 m.) above sea level, visible 10 miles, is shown from a white iron tower 17 feet (5.2 m.) high over a house located on Roun Rock off Arablar Island in Kutali Road. (See Light List.)

**Kutali (Ekinik)** is a small and narrow island lying ¾ mile northwestward of Arablar. It is 2 miles long by 800 yards wide and the shores are all rocky or cliffy. Ag. Elias Hill, with rounded sides and a flat summit, rises to 500 feet (152.4 m.) on the western side of the island, the center and eastern portion of it being much lower. The town stands in the center of the southern side of the island, and formerly possessed a good deal of small shipping plying in the Marmara and neighboring seas.

**Water.**—There is a good fountain of water, but being on the north side of the island it is all but inaccessible to boats.

**Kutali Channel,** between Arablar and Kutali Islands, is not available for vessels of over 23 feet (7.0 m.) draft of water, as a bank of 24 feet (7.3 m.) connects the two islands. The channel is, moreover, considerably narrowed by banks with depths under 3 fathoms (5.5 m.) which extend from both shores and from the eastern point of Kutali, but is much used by sailing vessels trading to Constantinople in the winter, as they generally take this route when going eastward. Starting from the Dardanelles in the morning, a large number of these vessels frequently anchor in Kutali Road in the evening, either to await daylight for their further advance or when fearing a change in the direction of the wind.

On the Kutali side the shallow bank stretches 300 yards south of Kalolimionos Point, and is here and up to Kutali village exceedingly steep. A bank of 4 fathoms (7.3 m.) lies ½ mile southeastward of Kalolimionos Point as charted. One-fourth of a mile eastward of the point it runs within 100 yards of the shore, and then again increases its distance till at a point south-southeast of the village it forms a narrow horn projecting ½ mile. Eastward again of this it maintains a width of about 400 yards, which is also the distance to which a rocky ledge called Hudro Plaka extends southeastward of Ag. Triada, the eastern point of Kutali. The current makes a very distinct ripple on the Hudro Plaka ledge.

On the Arablar side of the channel off Voli Point the 3-fathom (5.5 m.) edge extends only 100 yards from the shore. From here it trends westerly for ¾ mile, where it is 800 yards from the Arablar shore; it then turns sharply to the south and runs into the coast at the low sandy point north of Aphisia.

No ranges can be given for passing through Kutali Channel, but a course in mid-channel, steering about 57° from a position about 1,200 yards northwest of Kutali Road Light, will take a vessel over the bar in a depth of 4 fathoms (7.3 m.), clear of danger if kept in the center of the fairway.

The current runs about west and will edge a vessel over toward the Kutali side; but unless going very slowly it will hardly be felt in the short distance. An eddy current sometimes sets northeastward with a velocity of 1½ knots.

**Wreck.**—A wreck with a large spar showing above water lies 0.4 mile 106° from Ag. Triada Point and constitutes a danger to navigation.

**Kutali Road** is a good anchorage in northeast winds and much frequented in the winter by sailing vessels. The anchorage, in 6 to 10 fathoms (11.0 to 18.3 m.), sandy mud, is situated south of the village and westward of the 3-fathom (5.5 m.) horn before mentioned.

The best berth is in 8 fathoms (14.6 m.), with the west end of the village bearing 347° and a red-roofed mill on the point immediately east of the town in range with a hill 170 feet (51.8 m.) high on the north point of Kutali bearing 43°. There is a little swell here in strong northeasterly winds, but nothing to affect a ship with good ground tackle. In southwesterly gales Kutali Road affords no protection and should be avoided. In this case a vessel should run for Pasha Liman.

**Khairsis Adasi or Ayansha** (*40° 39′ N., 27° 29′ E.*) is a barren rock of a gray color 330 feet (100.6 m.) high and about 1,200 yards in length, lying westward of the northwest point of Marmara Island, from which it is separated by a channel 1¾ miles in breadth with 35 to 45 fathoms (64.0 to 82.3 m.) of water.

**Khairsis Adasi Light.**—A flashing white light, 361 feet (110.0 m.) above sea level, visible 10 miles, is shown from a white circular reservoir on the northern hill of Khairsis Adasi. (See Light List.)

**MARMARA ISLAND (Mermer Adasi)** is the principal island of the sea to which it gives its name. It is 10 miles in length from east to west, 5½ miles in breadth, and lies 40 miles eastward from Gallipoli Lighthouse, 20 miles southward of Rodosto, and 5 miles northwest of Artaki Peninsula.

**Aspect.**—The island is mountainous throughout. The summits of the double chain of hills which extend more or less from east to west are frequently seen from Gallipoli and serve as a mark for vessels navigating to or from the westward. It is divided into two distinct geological portions, the northern half, from Galimi village to Beyaz Burnu, being all of white marble with scarcely any soil on it. The hills are angular, the valleys abrupt, and, excepting at the bottom of the latter, there is no vegetation or cultivation. The southern half of the island is of a slaty rock with occasional patches of granite, and the valleys and lower slopes are well cultivated and fertile. The mountains of this portion, which are higher than the northern, are craggy, but have some fairly level places between them. Psili Dagh, the highest peak, is a long ridge which shows as a peak only from a northeast or southwest direction. It is 2,320 feet (707.1 m.) high.

The celebrated marble quarries in the northeastern part of the island, which have been worked in all historic times and of which the ornamental buildings of all towns on the Marmara have been built, are still worked, but on a very small scale compared with the works of former years. The débris from the quarries have formed on the shores of Mermerjik Bay a steep white slope, very conspicuous from the northward.

**Villages.**—There are six small villages in Marmara, all on the coast. The shores of the island are steep and free from danger with the exception of the Laza Rock in Klazati Bay. The water off the north and west shores is very deep.

**Anchorages.**—On the south side vessels can anchor in any of the small bays, but heavy squalls which vary considerably in their direction come off the land and the anchorage bank is narrow and generally steep. The best anchorage on the south shore is off Ag. Georgios Monastery in the eastern part of Klazati Bay in about 15 fathoms (27.4 m.), with the monastery bearing 31°.

**Marmara channels.**—Marmara Island divides the Sea of Marmara into two channels. The northern, between the island and the European shore, is 10 miles wide and free from danger, and used by nearly all vessels bound to the Bosporus during the finer season of the year.

The southern channel, known as Marmara Channel, between Marmara Island and the Pasha Liman group, 3 miles wide at its narrowest part and nearly as clear as the northern one, is much used in the winter by vessels going eastward starting with fair winds, as southerly winds are believed to be more frequent on that shore. There are also good anchorages handy in case of bad weather, but the westerly going current runs much stronger south of Marmara than to the north, and with northeast winds the wider north channel is to be preferred.

**Dangers.**—The shores are everywhere steep-to, with the following exceptions: The 4-fathom (7.3 m.) patch lying 900 yards off the middle point on the north side of Arablar, and which is only a danger to vessels of heavy draft, and the Laza Rock off Klazati Bay in Marmara.

The southern channel is by no means a bad route when going from Constantinople to the Dardanelles in clear weather, as by adopting it the stream of steamers coming in the opposite direction through the north channel is avoided. The light on Fanar Adasi is a good guide for entering the channel and the south points of Marmara are bold and easily seen at night.

**Marmara village** (*40° 35′ N., 27° 34′ E.*) is on the site of the ancient town, of which no remains exist. The anchorage is not good and the foregoing remarks with regard to squalls refer especially to this bay, which is backed by high and abrupt mountains. There is good water to be had in the town, but in a dry summer the supply is scarce.

**Laza Rock**, situated 800 yards 168° from the eastern point of Klazati Bay, is very small and surrounded by deep water. It has 9 feet (2.7 m.) on it, and there are from 18 to 28 fathoms (32.9 to 51.2 m.) between it and the shore. It is a danger only to vessels hugging the shore or running for an anchorage in Klazati Bay. Any part of Ekinik Island open of the south coast of Marmara leads southward of the rock.

**Palatia Bay** is an inlet on the northeast part of the island in the neighborhood of the quarries. The northeast wind blows home, but there is protection in the eastern part in 5 to 6 fathoms (9.1 to 11.0 m.) with the left extremity of the point to the northward bearing 15° and the northern end of the long sandy beach 93°. The village is poor, intensely hot in summer, and water is scarce, but there is a good well at Ay Ioanni Monastery, a little way inland.

**Mermerjik Bay**, an inlet immediately east of Palatia, is entirely open to the northeast. There was formerly a village in the eastern corner, but the quarries are now so little worked that it has been long deserted.

**Nisi Island**, on the western side of Mermerjik, with its surrounding rocks and islets is cliffy and sterile, and has a boat channel between it and the main.

**Fanar Adasi**, a marble islet lying 1,200 yards east of Beyaz Burnu, the eastern point of Marmara, is 100 feet (30.5 m.) high and steep-to on all sides except on the west, where shoal water with some rocks awash extends for nearly 400 yards.

**Marmara Island Light.**—A group flashing white light, 131 feet (39.9 m.) above sea level, visible 12 miles, is shown from a white quadrangular stone tower 29 feet (8.8 m.) high located off the east point on Fanar Adasi Islet. The light is obscured between the bearings 257° and 260° by Ag. Georgios Island. (See Light List.)

**Mola Islands**, three in number, lie off Kapsala Burnu, the eastern point of Artaki Peninsula, from which Ag. Andreas, the nearest, is 1¾ miles southeastward. The islands are all rocky and have outlying rocks in several directions. Ag. Andreas, the largest, is 200 feet (61.0 m.) high and nearly ¾ mile in its extreme length. Ag. Georgios and Mexa are about one-fourth the size of the other, and are, respectively, 150 and 110 feet (45.7 and 33.5 m.) high.

**Mola Islands Light**, occulting white, 131 feet (39.9 m.) above the sea and visible 10 miles, is exhibited from an iron column having at the base a white house with a red roof on the northwestern point of Ag. Andreas. (See Light List.)

**Agria Petra** is a sunken rock awash, lying ¾ mile 135° from Mexa. It seldom shows and is separated from Mexa by a channel ¼ mile wide with depths of 11 to 16 fathoms (20.1 and 29.3 m.).

**Anchorage.**—There is good anchorage under the Molas in northeast winds in about 14 fathoms (25.6 m.), with the left extremity of Ag. Andreas bearing 334° and the right extremity of Mexa 95°. The bottom is mud with coralline lying on its surface, which alone the lead will bring up.

An 8-fathom (14.6 m.) bank which extends off the southwest point of Mola is not so good, being mostly of sand.

**Perama Bay,** the eastern gulf formed by the peninsula of Artaki, is 7 miles long and 3½ miles wide. It is fully exposed to the northeast winds, from which there is no protection excepting in two small anchorages on the Artaki side.

**Villages.**—On the peninsula are the villages of Muhania near the eastern point; Perama, which gives the bay its name, 2 miles farther west; and Ermeniköi, 2 miles east of the isthmus. These are all thriving little places. The first has a small mole to protect caiques, and at Perama the shape of the bay also affords good shelter. Yeniköi, at the peninsula side of the isthmus, is a mere hamlet.

The town of Panderma and the small villages of Mamun and Dutliman are situated on the south shore of Perama Bay, which is mostly steep-to.

**Anchorages.**—Kum Liman, halfway between the villages of Perama and Ermeniköi, has a considerable area of anchorage ground in 11 to 18 fathoms (20.1 to 32.9 m.) mud, and the point of Velar Burnu affords a little protection in northeast winds, but they draw too far east to prevent all swell from coming in. There is a good stream in Ag. Athanasius Valley, the western valley of Kum Liman.

There is a better anchorage in the bay east of Ermeniköi, into which the swell does not fetch so much, in 14 fathoms (25.6 m.), with the point immediately eastward of it and Kalin Burnu in range and a small cliffy point in the bay bearing north.

**Panderma Bay** (*40° 21′ N., 27° 58′ E.*).—This small bay in the southernmost part of Perama Bay has the lowest land in the neighborhood, on which is the town of Panderma. At ¾ mile inland the land rises to 260 feet (79.2 m.), and then slopes almost imperceptibly to the shores of Manias Göl, 6 miles inland. West of this dip rise the bare, rounded hills of Dilikli Bair, 1,150 feet (350.5 m.) high, and to the eastward the spurs slope steadily up to the higher mountains of Kara Dagh.

A mole 820 feet long affords some protection to the harbor. The old breakwater is destroyed, the head, which is under water, being marked by a post.

**Panderma Light.**—A flashing red light is shown from the outer end of the mole at Panderma.

**Mooring buoy.**—A large mooring buoy is moored 400 yards 220° from Panderma Light.

**Anchorage.**—This port can not be entered by large vessels during northerly or northeasterly winds. Strong northerly winds make up suddenly, and all vessels are cautioned to be ready to leave the port at any time, as the harbor is unsafe while these winds are blowing.

The anchorage for large vessels is in sandy bottom with very poor holding ground.

Large vessels must anchor outside and discharge or load cargo by the use of lighters.

The best anchorage is in 8 fathoms (14.6 m.) of water with the end of the breakwater bearing 65° and the minaret of the mosque bearing 110°. A large vessel with 45 fathoms of chain out can swing at this anchorage in not less than 4½ fathoms (8.2 m.) of water.

**PANDERMA** stands on the slope of the hill facing the west on Panderma Bay. Population about 3,000.

**Wharfage.**—Vessels up to 4,000 tons can berth alongside the outer end of the mole, but there are no lifting appliances; as a rule, vessels discharge into lighters, of which several are available.

There are three small jetties within the bay.

**Supplies.**—A small amount of fresh vegetables are obtainable and water is supplied by a spring just beyond the town, but is slightly brackish. Fresh water is brought across from Ermenikoi in water boats.

**Trade.**—The exports are wool, cotton, opium, valonia, sheep, cattle, and cereals to Constantinople, and a small amount of boracite ore from some mines on the upper Mikhalich. The imports consist of calico, woolen, and linen goods, iron, copper, steel, tin, coffee, and sugar.

**Communication.**—A railroad runs southward from Panderma through Balikesri and Soma, joining the main line from Smyrna at Manissa, a length of 173 miles. A few steamers and vessels of small size call every year for cargo, and steamers ply between Panderma and Constantinople daily.

**Manias Göl,** a large sheet of water 10 miles long from east to west with a breadth of 7 miles, 20 feet (6.1 m.) above the sea, stands on an extensive plain which also contains Abuliond Göl, and is bounded on the north by the hilly country bordering the Sea of Marmara and on the south by high mountains far inland. Eastward the plain extends to the slopes of Olympus. There are many small villages and farms in this plain, which is, however, mainly under grass and supports a large quantity of cattle. The Manias Göl, which abounds with fish and is the resort of thousands of waterfowl in the winter, has for its outlet the river called the Kara Dere, which falls into the Susigirli Chai, a little below Mikhalich town and would probably be navigable for boats of light draft were it cleared of trees and snags.

**Coast.**—Eastward of Panderma the coast line trends eastward for 24 miles to the mouth of the Susigirli. To within 6 miles of the river the shore is rocky and for the most part precipitous, the land rising rapidly to Kara Dagh, 2,730 feet (832.1 m.) high, the summit of the wooded range which backs all this piece of coast.

At a small village called Yeni Köi, 6 miles west of the Susigirli, the hills retire from the sea 1½ miles, leaving a perfectly flat plain between them and the low sandy shore, which is for the most part inundated in winter.

The villages on this coast are small and wretched. A quantity of firewood is cut for use at Constantinople.

**Anchorage.**—There is no protection, even for caiques, except off the small village of Dutliman, built on a low promontory 4 miles east of Panderma, where the natural configuration of the land is aided by a small mole and the holding ground is good; but vessels can anchor anywhere on this coast from ¼ to ½ mile from the shore in from 10 to 20 fathoms (18.3 to 36.6 m.). Holding ground varies, but is generally good mud; off Kurshunlu village especially the mud is very stiff, and from here eastward the anchorage ground widens considerably.

**Susigirli (Moalitch) Chai** (*40° 24′ N., 28° 31′ E.*) discharges through the center of a broad plain which has probably been formed by the river itself and now projects 2 miles northward of the hills, making a low, rounded point in the coast line. The narrow pass in the hills through which the river runs is open when bearing 200° and plainly visible from seaward. The plain extends 4 miles on either side of the river. On it are large lagoons and swamps, which swarm with wild fowl in the winter.

The mouth of the river at the extremity of the point (Sazkave Burnu) is about 200 yards wide, and may be distinguished by a coffeehouse (the only house on the shore for miles) which stands on the western side of the entrance.

**Bar.**—The position of the bar varies and the depth of water on it ranges from 3 to 7 feet (0.9 to 2.1 m.). When there is much water in the river and consequently a strong current running out a very slight wind from the north raises a roll on the bar which is dangerous to deeply laden boats.

Ascending the river to Vavara, 5 miles, a depth of 6 feet (1.8 m.) will be found in all seasons, but in summer shallows extend across from bank to bank which prevent all but very small boats passing, and here caiques load and unload. From October to May, when the river is full, craft drawing 5 feet (1.5 m.) can pass up to the town of Moalitch, 13 miles in a straight line from the entrance, or to Abuliond Göl.

The Abuliond Chai, which flows from the lake, joins the Susigirli proper 10 miles from the coast and is deeper and larger than the main river.

The Kara Dere, which drains Manias Göl, joins the Susigirli 2½ miles above the other junction. The river is obstructed by snags and fallen trees, but could probably be made navigable if required.

At Mikhalich town, a large place standing on a low hill in the plain south of the coast ranges, there is a shallow part of the river where once stood a mill dam.

**Anchorage.**—There is good holding ground on the extensive mud flat which is formed by and extends off the Susigirli for 2 miles. A berth in 7 fathoms (12.8 m.) with the coffeehouse bearing 234°, will be found convenient, as from there the river is open and boats can be watched crossing the bar.

A good deal of swell comes in with a northeasterly wind, but vessels have ridden out a fresh gale without moving their anchors, and it was found that the thick river water lessened the sea considerably.

**Abuliond Göl (Lake Apollonia),** about 13 miles from east to west and about 6 miles in breadth, is shallow, having nowhere more than 2¾ fathoms (5.0 m.) as far as sounded, and its southwestern shores are edged with thick reeds to such an extent that it is impossible to determine where the true shore lies. The area submerged varies greatly with the season in this portion, but the north and southeastern shores are permanent. The lake is fed by the Adranos Chai, which empties through the reedy swamps in the southwest portion, and the town of Apollonia is on a peninsula toward its eastern end.

To the west of the lake stretches the wide plain through which the Susigirli runs and which also includes Manias Göl. The north is undulating ground rising gradually from the lake, while to the south and east high hills, spurs of Olympus, come more or less close to the borders of the lake.

**KALOLIMNO (IMRALI) ISLAND** (*40° 33′ N., 28° 32′ E.*) lies 7 miles to the north of the Susigirli Chai and 10 miles to the westward of Boz Burnu, on an extensive bank of soundings which affords good anchorage ground on all sides of the island. It is 3¼ miles in length from north to south and 1½ miles in breadth at the widest part. The surface of the island is much broken, the highest peak, a sharp conical one 690 feet (210.3 m.) high, being at the northern extremity, which is of a hammer-head shape and thereby affords protection in northerly winds to the bays on either side of the island.

Its shores teem with fish, but being situated to leeward of Constantinople, both as regards the prevailing wind and the current, prevents any trade in such a perishable article. A considerable portion of the island is cultivated, prominence being given to the production of onions. Enough wine for the use of the populace is made from grapes grown on the slopes above the town, which is a small place built on the north shore of the eastern bay and bears the same name as the island.

**East Bank.**—Off the eastern side of the island a sand and coral bank with from 16 to 20 fathoms (29.3 to 36.6 m.) water on it stretches 6½ miles southeastward.

**Anchorage.**—East Bay is the best anchorage in ordinary summer weather, when the northeasterly winds, though fresh, are not sufficiently strong to be feared; but in the heavy gales of winter West Bay is preferable. Milos Point, on which are three mills, bearing 37° and the eastern extremity of the town 346° is a good berth in 10 fathoms (18.3 m.) sand and mud, with fair holding ground 400 yards distant from the town.

The native caiques lie close to the town inside a small breakwater.

**West Bay** has the disadvantage of being open to the westward, but is a very good place in northerly and northeasterly winds. The bottom is sand only, but it holds well. With a heavy northeasterly gale and sea the anchorage here will be quiet, and the wind seldom shifts from that quarter to the westward.

The western extremity of the island bearing 357° and the monastery south of Trikos Point 81° is a good position in 6 fathoms (11 m.), but a small vessel can go farther in with advantage.

**West Bank.**—The bank of shoal water on the west side of the island also extends a considerable distance from the land, the 10-fathom (18.3 m.) curve being as much as 2½ miles from the shore of West Bay.

**Dangers.**—At a distance of 2 miles west-northwest from Agios Elias Point are some 9-fathom (16.5 m.) patches of sand and coral.

**Lena Reef.**—From Lena Point, the low southern extremity of the island, a narrow spit of sand and coral with patches of less than 6 feet (1.8 m.) water extends 205° for 1.9 miles, where the depth falls suddenly from 2 to 20 fathoms (3.7 to 36.6 m.). This reef is nearly always visible and the current frequently races over and round it, creating overfalls, which help to mark its position.

**Magnetic disturbance** has been experienced southward of Kalolimno Island; particular attention should therefore be paid to the indications of the compass when navigating in this vicinity.

**Coast.—Eskel Liman** (*40° 22′ N., 28° 40′ E.*).—From the Susigirli the shore trends east-southeastward for 7 miles to Eskel Liman, a small bay where a vessel can anchor in fine weather in about 5 to 6 fathoms (9.1 to 11 m.) and where there is good landing at a small breakwater at all times.

From Utgu Burnu, the eastern point of Eskel Liman, the coast becomes cliffy and steep, the spurs and ridges from the high land of Kuzgunjuk Bair stretching to the very shore. The shore line trends in a general easterly direction for 10 miles to Mudania, diversified by a few insignificant bays and the villages of Trilia and Siki. Off this coast there is no anchorage.

**INJIR LIMAN (Gulf of Mudania)** is a broad and open gulf formed by the lofty peninsula of Boz projecting to the westward 17 miles from Gemlik, which is situated at the head of the gulf.

The gulf is surrounded by mountains on all sides, mostly bare or covered with stunted brushwood, but the higher peaks, such as those in the center of the Boz Peninsula and the lofty Kiölu Dagh to the eastward of the gulf, are well clad with pine forests. The Mysian Olympus, named by the Turks Keshish Dagh, with its long and generally snow-clad ridge 8,190 feet (2,496.3 m.) above the sea and at the foot of which stands Brusa, is conspicuous in the south.

There are numerous small villages on or near the shore. The valleys round the gulf are very beautiful and fertile and are for the most part cultivated, mulberry trees predominating.

In the mountains of the Boz Peninsula are bears and deer, but they are not easily found.

**Anchorages.**—The gulf is 17 miles in length east and west by 5 miles in breadth, and is open to the westward. The water is deep throughout, and in the whole of its 40 miles of coast line there are but two fair anchorages—one close to the southeastward of Boz Burnu, the other at Gemlik—for though Mudania is used as the port of Brusa and has most of the trade, the anchorage is very inconvenient, not to say unsafe, and the same may be said of the other spots where there is room to drop the anchor. A short but heavy swell gets up with any fresh wind, and heavy squalls come off the mountains from all directions. If running for shelter in a northerly gale the anchorage under Boz Burnu, off Armudli, will be found convenient and safe and much less out of the way than Gemlik.

**Arnaut Burnu** (*40° 23′ N., 28° 52′ E.*), the point west of Mudania, is a conical-headed eminence 370 feet (112.8 m.) in height which shows well on approaching from the westward. A very conspicuous road which winds round and halfway to the summit serves also to distinguish it.

**Anchorage** off Mudania is indifferent, the bank of soundings being narrow. A vessel must drop her anchor at 20 fathoms (36.6 m.) to have room to veer, and as heavy squalls sometimes come suddenly from northwestward, a good lookout must constantly be kept. The water shoals quickly from 15 fathoms (27.4 m.), the best berth being in 20 fathoms (36.6 m.), mud, about 500 yards from the shore to the eastward of the town, northward of the railroad pier. Westward the bank is narrower and therefore not so convenient for anchoring.

**Mudania Light.**—A fixed red light 21 feet (6.4 m.) above the level of the sea, visible 6 miles, is shown from an iron davit at the head of the military jetty at Mudania.

**Buoy.**—A red spar buoy with square top mark marks the outer end of the rocky shoal situated about 100 yards northwestward of the wooden railroad pier.

**MUDANIA,** on the south shore of the gulf, is 10 miles south-southeastward from Boz Burnu and is the port of Brusa, situated 14 miles to the southeastward and having a population of about 76,000. It is built on a flat shore backed immediately by well-cultivated hills, on the summit of one of which, just above the town, are two conspicuous windmills without sails, having the appearance of Martello towers. Population about 4,000.

**Piers.**—The port of Mudania is entirely open and loading is performed by lighters, which in bad weather is impossible. There is a landing pier belonging to the railroad company, to use which permission should be obtained. The depth at its outer end is about 24 feet (7.3 m.). This pier is in a bad state of repair and a wreck lies sunk on its southeastern side, on account of which vessels can not go alongside. A new pier 240 feet long, 100 feet wide, has depths of 17 to 27 feet (5.2 to 8.2 m.).

**Communication.**—Steamer service with Constantinople and daily train service with Brusa. There is a telegraph office. A macadamized road leads to Brusa, 14 miles.

**Keshish Dagh.**—The summit of Keshish Dagh, or Mysian Olympus, a long bare ridge stretching west-northwestward and east-southeastward, with small peaks of nearly equal height, rises 8,000 feet (2,438.3 m.) above the sea, the highest peak being the third from the western end of the ridge and 8,190 feet (2,496.2 m.) high. There is snow in the gullies all the year round, hardly discernible at a distance during the summer months.

**Coast.**—From Mudania to Tuzla Burnu, 10 miles eastward, the coast curves into a bay, but the water is too deep for convenient anchorage, though in the bight of Kavakli Liman, east of Kurshunlu village, the same kind of berth as at Mudania may be found. Behind Altintas and Kurshunlu rises the craggy mountain of Filar Dagh, 1,940 feet (591.3 m.) high.

**Tuzla Burnu** is low and sandy, with salines and marshes behind. This point is reported to extend 200 yards farther northward than charted.

**Gemlik Bay** is at the head of the gulf. The hills around are thickly planted with olives, and the valley which extends back for a short distance eastward is well cultivated.

The pass through the mountains eastward, down which flows the rapid but shallow outlet of the Isnik Göl, affords communication with the rich country around the lake and a certain amount of trade is carried on from that direction, chromium, among other things, being brought down to Gemlik for shipment; but the commerce of Brusa nearly all goes to Mudania, as, though there is also a macadamized road between Brusa and Gemlik, the gradients are steeper, it is slightly longer, and not kept in as good repair as the more frequented route to Mudania.

On the south side of Gemlik Bay are the remains of the naval yard, now deserted, westward of which fish traps extend for about 150 yards from the shore. There is also a wooden mole alongside which small vessels can lie; about ¼ mile south of this mole there is a silk factory and several buildings which afford a good landmark.

Five hundred yards back from the beach, to the southeast, are some hot springs over which baths have been built.

**Conspicuous objects.**—The following objects in Gemlik Bay are conspicuous: The minaret on the northern side of Gemlik Dere; a chimney about 400 yards southward of the town; the bridge over the hot springs; and the northwestern end of the wall of the naval yard on the southern shore.

**Anchorage.**—The most sheltered position is in the southeast corner of the bay, and a very good berth will be found in 14 fathoms (25.6 m.), with the bridge over the hot springs stream 122° and the minaret at the southeast corner of the town 40°. A small vessel can lie closer in to the southeastward with advantage. Though westerly winds blow home here, there is little sea and the holding ground (mud) is good.

**GEMLIK**, at the head of the bay, has a more modern appearance than any other town on the shores of the Sea of Marmara. Population about 5,000.

**Piers.**—A pier with 12 feet (3.7 m.) alongside, reported to be in ruins, is situated at the south end of the town. The remains of another pier are about 400 yards to the southward.

**Supplies.**—Water is good and abundant.

**Communication.**—Steamers from Constantinople call twice a week. Telegraph station.

**Coast.**—From Gemlik the shore trends northwestward 5 miles to Karajali, and from there west-southwestward to Yassi Burnu.

Yassi Burnu, 8 miles westward of Gemlik, is a projecting point with a hill over it and is steep-to.

From Yassi Burnu to Boz Burnu is 9½ miles, the shore being steep-to until abreast of Armudli village, with the exception of a small 4-fathom (7.3 m.) bank with thick mud on it, situated 200 yards from the shore about 400 yards to the westward of Fistikli Valley.

**Armudli anchorage.**—A little eastward of the southern angle of Boz Burnu and opposite the village of Armudli is very good anchorage in northerly winds. The lead will only bring up a small branched coralline, but underlying the surface is stiff mud, in which the anchor will get a good grip. The best position is east of a

5-fathom (9.1 m.) bank that extends off Meykhane Burnu in about 10 fathoms (18.3 m.), with the left extremity of Boz Burnu bearing 295° and the rounded summit of Moskov Tepe 352°.

**Boz Burnu** (*40° 32′ N., 28° 47′ E.*), a bold headland with cliffs, is steep-to and can be rounded within ¼ mile.

A bank stretches off the northwest point for about 700 yards, where from 9 fathoms (16.5 m.) it drops quickly to 20 fathoms (36.6 m.).

**Coast.**—The north shore of the Boz Peninsula from Boz Burnu to Deve Boyunu Burnu, 19 miles, is bold and steep-to. The mountain ranges extend their spurs directly to the beach and there is no safe anchorage. A vessel can bring up, however, on a narrow bank off the village of Ag. Kiriaki in southerly winds, but could not remain with a strong breeze from the north, and the same may be said of the bay to the west of Deve Boyunu Burnu.

**Katirli** is a village about 1 mile southwest of Kalem Burnu. Three miles southeast, and on the summit of Beylik Karlik Dagh, snow is collected, which supplies the metropolis during the year.

**Deve Boyunu Burnu,** from its quoinlike shape and steep cliffs 100 feet (30.5 m.) in height facing the north, shows prominently from the east or west.

One mile eastward, off the village of Kurukoi, is another temporary anchorage in from 12 to 18 fathoms (21.9 to 32.9 m.).

**Coast.**—From Deve Boyunu Burnu to Chatal Burnu, 11 miles east, the coast changes in character, the higher hills retire into the background and the sandy beach is only backed by low spurs.

**Anchorage.**—The best anchorage on this shore is just eastward of the breakwater at Yalova in 19 fathoms (34.7 m.), mud with the beacon bearing 144°; holding ground good and plenty of room. There is also good anchorage in 13 fathoms (23.8 m.), stiff mud, off the village about 350 yards from the pierhead.

**YALOVA,** the principal village in this locality, consists of about 50 houses and is equidistant between the two points.

**Piers.**—There is a stone pier at the village 140 yards long with a depth of 9 feet (2.7 m.) alongside, and there is also a very snug little port 1 mile westward formed by a breakwater protecting the mouth of the Samanli Dere, and into which caiques can run in nearly all weather over the little bar on which is 4 feet (1.2 m.) of water, though it breaks with a fresh breeze. This breakwater, at the extremity of which is a white stone beacon, is a private enterprise and caiques are charged a small sum for its use.

**Communications.**—There is a telegraph office and steamer service with Prinkopo and Constantinople.

**Chatal Burnu** (*40° 42′ N., 29° 23′ E.*), a low, rounded, sandy point, is the commencement of the Gulf of Izmid. There is no bank off its extremity. There are a few conspicuous farmhouses on the shore between Chatal Burnu and Yalova.

**Landing places.**—On the north shore of the Boz Peninsula there are small breakwaters, forming landing places for boats, at the following spots: Hum Burnu, Pasha Iskalesi, on the western side of Deve Boyunu Burnu, ½ mile west of Kuruköi, and the mouth of the Samanli Dere. Landing can generally be effected at Ag. Kiriaki.

**Topography.**—The Boz Peninsula is a mass of lofty mountains intersected by numerous and picturesque valleys and passes. The culminating point on the peninsula is Tash Dagh, 2,970 feet (905.2 m.) high, but Yel Dagh, 5 miles northeastward of Gemlik, and therefore not strictly on it, is 3,140 feet (957.0 m.) in height. The main passes from the north side to the south all converge toward Yalova, and are Samanli Dere, which leads by a pass 800 feet (243.8 m.) above the sea to the Kumli Valley; Darli Dere, up which is a path leading to Gemlik over a mountain ridge 2,600 feet (792.5 m.) high; and Balaban Dere, up which a causewayed road carries the main traffic to the large villages of Chengiler, Bazarkoi, and Yenikoi, situated on the northern side of the Isnik Göl.

There are some hot baths in Hamam Dere, a subsidiary valley of Samanli Dere, which were formerly of great repute. They are romantically situated near a remarkable sharp peak called Sivriji.

**GULF OF IZMID.**—This most beautiful arm of the sea, 27 miles in length from Chatal Burnu to Izmid, is a deep cut through the mountains in an east and west direction. Its shores are in general very steep, and convenient anchorage is only to be found at certain places. The width of the gulf varies from 1 to 5 miles, and it is divided into three bays by the approach of the shores to one another in two places. The eastern one of these forms a very good harbor, with convenient depths throughout. Villages are numerous, and around them the ground is usually well cultivated, but much rich land lies waste.

Very heavy squalls come down the valleys, especially with southerly winds, and in thunderstorms, prevalent in some years, the puffs are sudden and violent. A short, choppy sea gets up with strong westerly winds, which sometimes blow completely home to the head of the gulf, making boat work unpleasant even at Izmid.

Fever is exceedingly prevalent after May until the break-up of the weather late in autumn, and at Izmid itself, which is very unhealthy, the residents seem to be liable to it at all times of the year.

**Traffic regulations.**—The following traffic regulations were issued early in 1923 by the Turkish authorities:

1. All vessels wishing to enter the Gulf of Izmid must approach the buoy which has been moored off Derija Burnu, situated in latitude 40° 45′ N., longitude 29° 23′ E. (approx.), hoist the pilot flag and stop. The pilot tug will then undertake the duty of piloting them into Derija.

2. Steamers are to wait in Derija until 2 p. m. and leave in convoy at that hour. The pilot will proceed in the leading ship. Vessels arriving at Derija after 2 p. m. are to wait until the following day.

3. Sailing vessels will be towed at the same hour by the pilot tug at Derija.

4. Steamers leaving the port of Izmid are to proceed at 10 a. m. and will be piloted as far as Derija. Sailing vessels leaving will be towed out.

5. Sailing vessels are not allowed to proceed under sail.

6. In order to prevent vessels from entering if they approach in contravention of these rules, a blank charge will be fired from one of the coastal batteries; if the vessel does not stop a shot will be fired across her bows.

**Topche Bay.**—From Chatal Burnu to Dil Burnu, 6 miles, the coast forms a bay called Topche Bay. There the coast hills begin to rise again and assume a steeper face to the sea, but a little flat ground intervenes between it and their foot.

A little to the eastward of Chatal Burnu the Chukurkoi Deresi falls into the sea. This river flows down a broad and fertile valley between the Kabakli and Chukur Ranges, and at times is a considerable stream. Seams of rather poor quality coal are found up this valley.

**Anchorage** (*40° 42′ N., 29° 26′ E.*).—In the bight of Topche Bay is a large area of good anchorage 600 to 1,400 yards from the shore in 5 to 20 fathoms (9.1 to 36.6 m.) mud. The best position is off a boat landing place (Topche Iskalesi), but should the wind come strong from northwestward there is more protection to be found at Kavak Iskalesi, eastward of Dil Burnu.

**Dil Burnu** projects far into the gulf and is very low; here the navigable channel between it and Kava Burnu on the northern shore, abreast, is only 1¼ miles wide. A small hill 95 feet (28.9 m.) high stands 1 mile to the south of the point, which at a distance appears as an island. West of this hill lies the village of Hersek, now in ruins, from which travelers by land take a fresh departure for Brusa or other places in the interior after crossing the gulf from Dil Iskalesi on the northern shore.

**Dil Burnu Shoal.**—Dil Burnu is bordered by an extensive shoal bank of mud and sand, ½ mile wide on the western side and stretching 600 yards north of the point; it is steep-to and should be approached with caution. The sand bank, which forms, as it were, the core of this shoal north of the point, varies much in height and length, according to the strength and direction of the previous winds, being sometimes above water, at others awash. The extremity of the shoal is not visible to the eye. The discoloration off the point is due to the wash of the currents and does not coincide with the limits of the bank. In rounding the point give it a berth of ½ mile. Two miles west-southwest of the point and 800 yards from the shore are some 9-foot (2.7 m.) patches on the edge of the bank, which here is at its greatest distance off.

Two and one-half miles southwest of the point is the mouth of the Yalek Dere, which when full discharges a considerable quantity of muddy water into the sea and discolors it far beyond the extent of the shoal water.

**Coast.**—From Dil Burnu the coast turns sharply to south-southeastward 4 miles to Kavak Iskalesi. Off all this coast there is good anchorage, but the shore is still skirted by the shoal bank, the 3-fathom (5.5 m.) curve of which is about 500 yards off in places. A large but shallow lagoon, containing a quantity of fish, opens to the sea 1½ miles from Dil Burnu, and the entrance is trapped by a fish weir.

**Anchorage.**—Kavak Iskalesi is the best anchorage in the western portion of the Gulf of Izmid, the holding ground being very good, with sufficient room and fair protection. With a northeasterly wind a short, chopping sea will get up. The position is marked by two small houses, off which vessels anchor in 11 to 15 fathoms (20.1 to 27.4 m.). This anchorage is reported to be shoaling, and landing can not be effected at the pier owing to the formation of a sand bank.

A conspicuous two-storied white house with red roof is situated about 600 yards northwestward of the entrance of Sarajik Ovasi.

**Coast.**—From Kavak Iskalesi the coast takes a general easterly direction for 12 miles to Gölzuk Burnu, with only minor sinuosities and no good anchorage in the whole distance, although a vessel may anchor in 20 fathoms (36.6 m.) nearly anywhere and have room to swing, but the squalls off the hills render it desirable to have more space than is generally available.

The hills approach closely to the water on this side, rising range after range to a height of 3,700 feet (1127.7 m.), and the valleys among them are very pretty.

Karamusal, now in ruins, was the largest village along this shore.

The vicinity of Karamusal produces quantities of fruit, but not of a very superior quality. Cherries are ripe in May and are followed by plums, peaches, apricots, walnuts, apples, and pears. A fishery has been established.

**Gölzuk Burnu** is a low, sandy spit, and with Zeitun Burnu, 1 mile distant on the opposite side, forms the entrance to the eastern bay of the gulf. Shoal water extends about 150 yards off it.

**Coast.**—From Gölzuk Burnu the coast continues its general easterly direction with several large bights, and there is good anchorage everywhere. It is all low and the hills recede from the shore again after Gölzuk Burnu is passed.

At Bash Iskalesi, the landing place for Ovajik, the end of the gulf is reached and the coast turns northward to the town of Izmid.

**Kiles Deresi.**—The eastern shore is very low and swampy, containing the delta of the Kiles Deresi. This stream takes its rise behind the fine mountain of Gök Dagh, flows down a beautiful valley south of Ovajik village, in which part trout are to be found, turns the machinery of a large Government cloth factory at Kular, where it debouches into the plain about 4 miles southeast of Izmid and discharges through swamps and marshes 1 mile south of the town. The deposit brought down by this stream has pushed forward the delta and is gradually shoaling the depths in the whole of the eastern bay of the Gulf of Izmid. Nothing but the lightest boats can enter the mouth of the Kiles Deresi.

The flat plain at the head of the Gulf of Izmid stretches eastward to Lake Sebanje, which discharges its waters into the Sangarius eastward, and not into the gulf. This plain is bordered on the south by the magnificent ranges of Gök Dagh, the summit of which is 5,330 feet (1,624.5 m.) high, and on the north by lower hills. It rises imperceptibly to Lake Sebanje, 8 miles away.

**Anchorage.**—There is excellent anchorage for any number of vessels off the town of Izmid in 5 to 12 fathoms (9.1 to 21.9 m.), stiff mud, the best position being in about 6 fathoms (11 m.), with the palace bearing north, distant about 600 yards. Westerly gales blow completely home and raise a disagreeable sea for boats, especially in less water than 6 fathoms (11 m.), but wind from this direction is not common, and when from any other direction the water is smooth.

**Conspicuous objects.**—A small palace on a hill above the old dockyard is conspicuous, owing to its commanding position and its white color and surrounding yellow walls.

A handsome clock tower is situated close westward of the western gateway of the palace. It is lighted at night.

There is a mosque at the east end of the town.

The Greek church, situated westward of the town, can easily be distinguished, as it stands just to the northward of a conspicuous grove of trees; it is painted blue and white and has a central dome.

**IZMID** (*40° 46′ N., 29° 55′ E.*).—This town stands on the face of some spurs sloping south, is built mainly of wood on stone foundations, and is very picturesque, most of the houses being situated among trees and gardens. The line of the old Roman wall is still to be traced in many places, especially behind the upper part of the town. Population about 13,000.

**Piers.**—There are several piers at Izmid, but no cranes or other means of handling heavy weights.

Opposite the railroad station are two piers 70 yards apart, the eastern about 300 feet in length, with 18 feet (5.5 m.) of water at its outer end; the western 180 feet long, with 5 feet (1.5 m.) at its outer end.

Eastward of the palace and near the captain of the port's office are two more piers each about 150 feet in length, with 18 feet (5.5 m.) of water at their outer ends. The western of these piers is known as the Stone Pier and is the best constructed pier in the port.

**Supplies.**—Fresh provisions are plentiful and good water is obtainable.

**Trade.**—The chief exports consist of maize, oats, silk, linseed, and tobacco; the imports consist of manufactured goods, sugar, coffee, iron, rice, and petroleum.

**Communication.**—The railroad from Haidar Pasha, a suburb of Skutari, which passes through Izmid, is open for traffic to Angora, also to Konia, Eregli, and Aleppo. Steamer service with Constantinople every other day. There is a telegraph station.

**Bank.**—The bight between the town and the mouth of the Kiles Deresi and the water off the eastern part of the town is all shallow, but off the old dockyard and as far east as the customhouse pier the 3-fathom (5.5 m.) curve is close to the shore. West of the town the bank again projects 400 yards.

To clear the bank when approaching or leaving keep the clock tower near the palace bearing 45°.

**Derinji Burnu.**—From Izmid the shore trends in a westerly direction 4½ miles to Derinji Burnu, thence 2 miles to Zeitun Burnu. This is all low coast with bays, and mostly shallow. The bay, however, just west of Derinji Burnu, on the shore of which stands a kiosk and a chiflik, is fairly deep, and although open is considered a safe anchorage.

**DERINJI BURNU** has become a place of some commercial importance.

**Wharves.**—There is a wharf with depths of from 13 to 24 feet (4 to 7.3 m.) alongside it, on the eastern half of which are two conspicuous large granaries. Close east of the granaries are three small pipes, the two easternmost of wood, with 20 feet (6.1 m.) of water alongside; the other is of iron, with 14 feet (4.3 m.) alongside it, and is used as a boat landing. There are several lines of rails on the wharf, which are connected by a branch line with the main line to Constantinople. The wharf is also furnished with traveling cranes lifting weights up to 10 tons. In a bight north of the wharf are two iron piers connected with the railroad, on one of which is a crane capable of lifting 10 tons. These piers appear to be used for lighters, as the approach to them is too shallow for ships. Buoys are laid off the large wharf as an assistance to ships berthing or hauling off.

**Water.**—Very good water can be supplied from mains on the wharf, and it is the best and most convenient place to obtain water in the Gulf of Izmid.

**Tutun Liman,** the bay immediately east of Zeitun Burnu, affords good anchorage for one vessel in 8 fathoms (14.6 m.) mud, in the center of the bay, with the eastern point of the bay bearing east and the chiflik or farm which stands a little inland north.

**Water.**—There is good water running from a pipe into a reservoir just below the farm.

**Zeitun Burnu,** a low, sandy spit inclosing a lagoon, has shoal water extending over 200 yards from the shore.

**Zeitun Burnu Light,** fixed red, 33 feet (10.1 m.) above the level of the sea, visible 8 miles, is shown from a mast on a white house on the extremity of Zeitun Burnu. (See Light List.)

**Coast.**—From Kileri Burnu, ½ mile west of Zeitun Burnu, the coast turns to north-northwestward with a low shore for 2½ miles to Kuchuk Iskalesi, where is situated the railroad station of Yaremji.

The station is a two-story yellow building with a dark-red roof and may be distinguished by a tall cypress tree close eastward of it.

A two-story white house situated on the shore southwestward of the station is very conspicuous.

**Anchorage.**—There is good anchorage along this coast with a muddy bottom in any depth required.

From Kuchuk Iskalesi to Herekhe the coast line trends to the west and the shore is too steep for convenient anchorage.

**Water.**—There is a good watering place under Kule Tepesi; a copious spring gushes out of the rock, from which a hose can be led to the boat anchored off, but there is no anchorage for a vessel near.

**Herekhe Bay** has a large silk manufactory. The anchorage here is not recommended, although a short stay might be made in fine weather, but the holding ground is not good. From this to Dil Iskalesi there is no anchorage.

**Tavshanjik** is a large village on the hills a little within the point of the same name; the railroad runs between.

**Kava Burnu (Dil Iskalesi Point)** is 1½ miles north of Dil Burnu and steep-to. Eastward is an extensive bank of 12 to 18 fathoms (21.9 to 32.9 m.), sand and stones. There is a railroad station at Dili Iskalesi and a ferry to Hersek.

**Kava Burnu Light** (*40° 46′ N., 29° 32′ E.*)—A fixed red light, 39 feet (11.9 m.) above water, visible 8 miles, is shown from an iron support over a square white house on Kava Burnu, east bank of Dil Deresi. (See Light List.)

**Coast.**—From Kava Burnu to Derija Burnu, 6 miles westward, the coast is steep-to and in most places too deep for anchorage.

At Eski Hissar are the remains of an old Byzantine castle, and on the ridge 1 mile northeast of it is the reputed tomb of Hannibal, marked by two isolated cypresses. A little farther north is the village of Gebze, with some picturesque groves of cypresses and minarets, only visible from certain directions.

Half a mile westward from the old castle is a factory on the foreshore, the tall chimneys of which are conspicuous.

**Derija Burnu** has yellow cliffs just to the westward of it and shoal water extends for nearly 400 yards off the point. The village of Derija is prettily situated on the slopes behind the point. On the ridge northwestward of Derija is an old mill, a very conspicuous mark.

**Yelken Kaya Burnu,** the north entrance of the Gulf of Izmid, is a fine, bold point with a rock 20 feet (6.1 m.) high close to the land at the point, which is fairly steep-to. Just north are some conspicuous white cliffs 230 feet (70.1 m.) high.

There is a large factory 700 yards east-northeastward from Yelken Kaya Burnu, the three tall chimneys of which are conspicuous except from the westward, when they are hidden by the land.

**Yelken Kaya Burnu Light.**—A flashing white light, 66 feet (20.1 m.) above the level of the sea, visible 13 miles, is shown from a white circular stone tower 65 feet (19.8 m.) high on Yelken Kaya Burnu, north side of the entrance. (See Light List.)

**Uch Burnu,** a flat peninsula with three low points, though 70 feet (21.3 m.) in height, appears lower on account of its shape and is not easily distinguished from the back land. It is fringed by a rocky flat to the distance of 200 yards.

**Tuzla Bay** is a considerable bight and affords anchorage and protection for a large number of vessels in northerly winds; although exposed to the southwest, the holding ground is very good and the sea is not heavy. The sand and coral which the lead will bring up in depths under 18 fathoms (32.9 m.) is underlaid by mud of a slimy character, in which the anchor will get a good grip.

The Mungafa rivulet rises in some beautiful springs 1 mile inland, but the water is impregnated with gas and is insipid to the taste. Its mouth is about ¾ mile northwestward of Uch Burnu.

**Pier.**—A pier 670 feet in length, within which is a small harbor dredged to a depth of about 7 feet (2.1 m.) extends in a southerly direction from the northeastern shore of the bay. Near it are two red brick chimneys and a factory.

**Anchorage** may be taken anywhere, according to circumstances. For a small vessel a berth in 7 fathoms (12.8 m.), with the left extremity of the town bearing 16° and the point of Mezar Burnu (on which is a conspicuous clump of cypresses) 87°, will be found convenient, and in westerly gales somewhat under the lee of the land running out to Tuz Burnu. For a large vessel a berth more to the southward will be better.

**Shoals.**—A shallow flat extends about 300 yards southward of Mezar Burnu, and continues across the bight in which the town lies and to Tuz Burnu. Westward of the recommended anchorage is Twenty-two-feet Shoal, northward of the eastern Deserter Island. A shoal with from 1¼ to 3 fathoms (2.3 to 5.5 m.) extends ⅓ mile northeastward of the eastern Deserter Island, and a bank with depths of 8 to 10 fathoms (14.6 to 18.3 m.), 500 yards in extent, lies about 1¼ miles eastward of the same island, and in the approach to the anchorage; vessels may enter on either side of that bank.

**Current.**—A strong current generally sets west through Tuzla Bay and past the Deserters.

**TUZLA**, situated on the northern shore of the bay, has a population of about 2,000.

**Piers.**—A small mole from Liman Burnu gives protection to caiques and affords good landing in all weathers.

**Supplies.**—Supplies are scarce and not of best quality. There is good water in a well adjoining the chapel behind the vineyard at the western end of the village.

**Communication.**—There is a railroad station 1 mile northeastward of the village.

**Tuz Burnu** (*40° 48′ N., 29° 15′ E.*) is a peninsula about 70 feet (21.3 m.) in height, with rocky shores of the same character as Uch Burnu and about the same height. Rocks, awash and above water, are scattered around it, the farthest danger being Selvi Rock with 6 feet (1.8 m.) on it 600 yards 213° from the point. On Tuz Burnu are some large salines, from which it takes its name.

**The Deserters** are two rocky islets lying 1,400 yards 160° and 1 mile 132° from Tuz Burnu, on separate banks, with navigable channels between them and the mainland. The eastern island is cultivated and has some large subterranean tanks of Byzantine architecture. Shoal water and foul ground stretches ½ mile northeast.

**Directions.**—Vessels may pass southward of the islets within 100 yards. Coming from the north and intending to anchor off Tuzla village, there is a good channel to the north of the Deserters with a good range, viz, Tavshan Tepe (a detached hill to the southward of the Aidinli Hills) in range with the north summit of a distant saddle hill, bearing 60°. This will lead through in 7 fathoms (12.8 m.) to the anchorage off Tuzla, northward of the Twenty-two-foot Shoal.

There is nothing to be gained under ordinary circumtances by passing between the two islets. There is a depth of 6½ fathoms (11.9 m.) in the fairway.

**Coast.**—**Ag. Georgios Burnu**, ¾ mile northward from Tuz Burnu, rises to a summit 75 feet (22.9 m.) high. From there the coast trends eastward and northward, forming a bay at the head of which are a few houses and a small breakwater.

**Andreas Island**, rocky, 145 feet (44.2 m.) in height and having a clump of pine trees on its summit, situated 1½ miles northeast from Ag. Georgios Burnu and on the south side of the entrance to Pavlo Liman, stands on a 2-fathom (3.7 m.) bank which connects it to a peninsula projecting from the mainland. The trees distinguish it from Pavlo Burnu, which is of a similar shape but bare.

**Pavlo Liman** is a large bay with even depths of 6 and 7 fathoms (11.0 and 12.8 m.) over a large area. Holding ground is excellent, and the island of Andreas affords good shelter from southwest winds to a small vessel anchored in the southern corner of the bay, and even to a ship more in the center, but the main part of the bay is open to the westward. The shores of the bay are low, and on the south side is a large open lagoon used as a fish preserve.

**Buyuk Dere,** which falls into the northeast corner of the bay, has a shoal bar, but is used by caiques as a port for local trade; above it is a mere rivulet.

**Pavlo Burnu** is a bare island peninsula 165 feet (50.3 m.) in height, with rocky shores.

**Mavro** is a small, low island covered with trees 400 yards northward of Pavlo Burnu. Inside is a shallow bay used by caiques.

**Anchorage.**—Pendik Road is a good anchorage in from 4 to 6 fathoms (7.3 to 11 m.) in the summer northeast winds, but not in other circumstances.

**PENDIK** is about 1¼ miles northwestward of Mavro Island.

**Supplies.**—Water is obtainable near a large plane tree ¾ mile eastward of the town, where a hose can be led directly into a boat from a running stream.

**Communication.**—There is daily steamer and train service with Constantinople, 15 miles away.

**Kartal,** about 2¼ miles northwestward of Pendik, is a larger town, but the anchorage is not good; it has a short pier adapted for boats only.

**Maltepe Burnu** (*40° 54′ N., 29° 09′ E.*) is fairly high, with a rocky shore. A bank with depths of 4 to 4½ fathoms (7.3 to 8.2 m.) extends southward nearly ¾ mile, following the eastern side of Prinkipo Channel.

**Drakos Tepe.**—Immediately back of Maltepe Burnu rises an isolated, bare, rocky, hog-backed hill 350 feet (106.7 m.) in height, called Drakos Tepe. The railroad runs at the back of it.

**Coast.**—From Maltepe Burnu the coast is low and straight in a north-northwesterly direction for 3 miles. It then curves to west-northwestward and is much broken up into little bays, with low red cliffs, for 3½ miles to Fanar Bagche. The land behind slopes gently upward to the mountains on Kaish Dagh, a treeless but fairly cultivated ridge 1,400 feet (426.7 m.) high standing 3 miles back from the coast.

**Maltepe** is a small village about 1½ miles northwestward of Maltepe Burnu, with a minaret and short pier.

**Anchorage.**—There is anchorage off all this coast, the water shoaling very gradually to the shore. A shoal bank extends off for about 300 yards, but outside that a ship may anchor anywhere between the mainland and the Princes Islands in 6 to 17 fathoms (11 to 31.1 m.) sand and mud, excepting near the shallow water about to be described.

**Maltepe Bank,** of sand and coral, is an extensive area with an average depth of 4 fathoms (7.3 m.) that projects for nearly 2 miles from the coast between Maltepe and Bostanji. It has four clusters of rocks which much encumber the passage between the Princes Islands and the main.

**Vorthonas** (*40° 55′ N., 29° 05′ E.*), the outer rock, is 3 feet (0.9 m.) high and stands at the western extremity of the Maltepe Bank, about midway between Maltepe and Proti Island. One hundred and fifty yards westward the water deepens abruptly to 10 fathoms (18.3 m.). Four hundred yards northeastward of Vorthonas, on the same bank, is a small cluster of rocks 1 foot (1.8 m.) high. Shallow water extends for 1,600 yards farther northeastward.

**Vorthonas Rock Light.**—A flashing white light, 20 feet (6.1 m.) above the level of the sea, visible 5 miles, is shown from a white iron column on Vorthonas Rock. (See Light List.)

**Batmez Vorthonas,** nearly 1 mile 22° from Vorthonas, is 3 feet (0.9 m.) in height. It is surrounded by a 3-fathom (5.5 m.) bank 500 yards in length.

**Sikli Vorthonas,** the northernmost rock, is only 3 feet (0.9 m.) high and has a very small patch of shallow water round it.

Between these banks and the mainland is a 24-foot (7.3 m.) channel nearly ½ mile wide, but of little service for navigation.

**Sikli Vorthonas Rock Light.**—A group flashing white light, 15 feet (4.6 m.) above the level of the sea, visible 5 miles, is shown from a white iron column on Sikli Vorthonas Rock. (See Light List.)

**Landmarks.**—On the peninsula formed by the Gulf of Izmid, the Bosporus, and the Black Sea are several mountains which serve as landmarks from various directions. Coming from the westward Aidos Dagh, Kaish Dagh, and the intervening hills are the most conspicuous. These stand not far from the coast east of the Princes Islands, Aidos Dagh, 1,733 feet (528.2 m.), being the highest land about. Northward of these the two rounded summits of the Chamlija Hills, 850 feet (259.1 m.) high, show up well in front of Alem Dagh and Chatal Dagh, which are 11 miles inland and do not appear remarkable from this side.

**Alem Dagh** is 1,460 feet (445.0 m.) high and stands 7 miles eastward from Kandilli on the Bosporus.

**Chatal Dagh,** also called The Brothers, is a hill with two equal and similar peaks 1,270 feet (387.1 m.) high and lies 4 miles southeastward from Alem Dagh. Coming from the eastward in the Black Sea Alem Dagh and Chatal Dagh are very conspicuous, the former appearing as a single peak. There are other summits in this locality, but those mentioned are by far the most conspicuous.

**Shapka Burnu,** nearly 1½ miles southeastward of Fanar Burnu, has two conspicuous white houses with white wall in front of it.

**Laz Burnu,** just eastward of Fanar Burnu, has a stone pier with sufficient water on the eastern side for large boats and lighters to go alongside. The western side of the pier is fouled by rocks.

**Fanar Burnu** is a small peninsula-shaped point, flat, edged with red and white cliffs, 10 feet (3.1 m.) high and well covered with trees, the grassy ground under which is the resort of many people on holidays. It projects about ½ mile southwest of the general line of coast and forms the south side of Moda Liman. The ancient Chalcedon was built on and immediately east of Fanar Burnu. Villa residences now cover the site, which is known as Fanar Bagche.

**Fanar Burnu Light.**—A flashing white light, 82 feet (25.0 m.) above the level of the sea, visible 10 miles, is shown from a white circular stone tower located on the west side of the point. (See Light List.)

**Hereke Tash.**—This rock lies a little over 200 yards west-southwestward of Fanar Burnu and has a pile of stones on it 10 feet (3.1 m.) high. There is deep water 150 yards west of the rock and a 2-fathom (3.7 m.) passage inside it for boats.

**Wreck.—Buoy.**—A sunken wreck is situated about 2,150 yards 133° from Fanar Burnu Light. A small red buoy marks the wreck.

**Moda Liman** (*40° 58 N., 29° 02′ E.*).—North of Fanar Burnu is the small bay called Moda Liman, ¾ mile long and the same distance across. Its southern and eastern shores are low, but the northern is a cliff 50 feet (15.2 m.) in height. The bottom of the bay is shoal, but in the middle and outer portions are from 4 to 6 fathoms (7.3 to 11 m.) water, sand and mud bottom.

The Kurbagha Deresi falls into the north corner of Moda Liman. A boat can get about ¼ mile up the river, as far as the Kadiköi cricket ground.

**Fanar Bank** is a long, sandy bank which stretches 1½ miles southward from Moda Burnu, the northwest point of Moda Liman, with 3½ fathoms (6.4 m.) water on its shoalest part, and closes Moda Liman to large vessels from the west. Between its eastern edge and Hereke Tash is a narrow 7-fathom (12.8 m.) channel leading into the bay, but no particular marks can be given for it.

**Directions.**—The right extremity of Dolma Bagche Palace open west of Leander Tower bearing 354° clears the Fanar Bank to the westward. This clearing mark can also be used by night, Leander Tower exhibiting a flashing red light and Dolma Bagche Palace being distinguishable by a distinct line of lights.

**Moda Burnu.**—The northwest point of Moda Liman is a cliffy-faced headland. On the point and extending north and east from it is the thriving and extending suburb of Kadiköi.

**Coast.**—From Moda Burnu the coast trends north for 2½ miles to abreast Leander Tower. This shore is in some parts low and in others bordered by sloping cliffs, but is edged throughout by a rocky flat with detached bowlders. This makes landing difficult everywhere excepting in the bight between Kadiköi and Haidar Pasha, which is sandy.

**A rocky ridge,** probably a relic of an ancient mole, stretches 300 yards from the shore 1,350 yards northward of Moda Burnu.

**HAIDAR PASHA HARBOR** is formed by a detached breakwater 650 yards long nearly parallel with the coast. The general depth in the harbor is 4 fathoms (7.3 m.). The northern entrance is 400 yards wide and the southern, which is only used by small vessels and boats, is only 130 yards wide.

**Lights.**—On each end of the breakwater at Haidar Pasha stands a white tower 47 feet (14.3 m.) high exhibiting a light, 46 feet (14 m.) above the level of the sea, visible 12 miles, the northwestern fixed red and the southeastern fixed green.

A fixed green light is shown from the northwest corner of the quay and a fixed red light is shown from the northwest corner of the mole. (See Light List.)

**Fog signal.**—A fog bell is sounded from the lighthouse on the southeastern extremity of the detached breakwater. (See Light List.)

**Wrecks.—Buoy.**—A sunken wreck, part of which is visible about 2 feet (0.6 m.) above the water, lies near the edge of the 3-fathom (5.5 m.) curve and 550 yards 5° from the obelisk on the detached breakwater at Haidar Pasha Harbor.

The wreck of a steamer with a least depth of 1½ fathoms (2.7 m.) over it lies sunk 400 yards 287° from the fixed red light on the northwestern extremity of the detached breakwater. A green and white buoy is moored close southwestward of the wreck.

A wreck marked by a red light lies sunk about 800 yards westward of the lighthouse on the northern extremity of the detached breakwater.

**Buoys.**—Two black buoys with cylindrical top marks are moored on the northeastern side of the north entrance channel in a depth of 26 feet (7.9 m.) to mark the limit of the fairway.

A mooring buoy is charted in the harbor.

**Directions.**—By day vessels entering the harbor from the northward must leave the black buoys with cylindrical top marks on the port hand.

By night the fixed red light on the northwest corner of the mole should be kept midway between the fixed green light on the northwest corner of the quay and the fixed red light on the northwest end of the breakwater.

Strong gales from west and southwest send in a little sea.

**Haidar Pasha**, eastward of the harbor, is the terminus of the Izmid Railway, which extends to the quay. The quay is 330 yards long, with an arm projecting 165 yards from its southern end. An elevator, situated at the northwest end of the quay, is capable of dealing with 2,400 tons of grain per day. There is also a 35-ton crane and floating shears capable of lifting 50 tons. Alongside the quay there is a depth of 22 feet (6.7 m.).

A pier exists at Kavak Burnu, about ½ mile northward of the harbor.

**Conspicuous objects.**—The cemetery is along the top of the cliff just north of Haidar Pasha, northward of which is the Turkish School of Medicine, a very conspicuous building, and again a little to the northward are the Selimiye Barracks, enormous yellow painted buildings with square towers at each angle, and which serve as ranges on making the Bosporus. Behind these the town of Skutari begins.

**Bosporus approach.—Anchorages.**—From the extremity of the Fanar Bank to Leander Tower is a good anchorage ground of variable width and generally out of the current. From Leander Tower to the Selimiye Barracks it is narrow and the edge of the shore bank is steep. It must therefore be approached with caution, but this is the part that is most used as an anchorage, mainly by steamers waiting orders or only calling for a few hours, to whom it is the handiest position for communicating with Galata.

South of the Selimiye Barracks the anchorage ground widens considerably, and from abreast them to the southward of Moda Burnu is over ½ mile wide, with depths of 5 to 10 fathoms (9.1 to 18.3 m.). Here, in fact, the deep-water channel leading from the Bosporus is very narrow, and with the exception of this a vessel can anchor anywhere across from Constantinople to Kadiköi. This ground is, however, but little used, as it is too far to leeward with regard to the current for communication.

There is also good holding ground and convenient depth anywhere between the Princes Islands and the shores of Europe, but of no service save for a fleet or to a vessel becalmed and carried away by the current.

Northward of Leander Tower the holding ground off Skutari has been found to be bad between the following positions: 900 yards and 1,500 yards 25°, respectively, from Leander Tower.

**PRINCES ISLANDS**, nine in number, take their name from Prinkipo, the largest of the group, and lie parallel to the coast of Asia south of the entrance of the Bosporus, from which the nearest is 6 miles. They are in general high, with cliffs of a bright red and yellow hue, owing to the large amount of iron and other minerals in the composition of the rock. The four larger islands, Prinkipo, Halki, Antigone, and Proti, which are inhabited, are the summer residences of many of the merchants of Constantinople, Prinkipo being the favorite. The others are little better than barren rocky islets.

**Water** is only obtained by tanks into which the rain is led.

**Prinkipo** (*40° 51′ N., 29° 07′ E.*), the largest of the group, is celebrated for its fine, healthy climate, which is doubtless partly due to the dwarf pines with which a large part of the island is covered, and also to the comparative dryness of the northeast wind. It lies 10 miles southeastward from Seraglio Point, and its length from north to south is over 2 miles by an average of ¾ mile in breadth.

The island is high and is divided into two portions by a dip in the hills. The southern and highest portion, 655 feet (199.6 m.) in height, is bare, rocky, and uninhabited, save for a monastery on its summit. The northern portion of the island is clothed with dwarf pines, and on this face is the town of Prinkipo, with its prettily arranged villas standing for the most part in gardens. There is telegraphic communication by cable with the mainland. A pier is situated on the western side of the island abreast a mill.

**Prinkipo Bank** is a sand and coral shoal that extends off the north shore of the island for ½ mile, with only 2 and 3 fathoms (3.7 and 5.5 m.) on it. The edge of this shoal, which is of very irregular shape, is mostly steep on all sides, and care must be taken on anchoring to give it a berth.

**Prinkipo Channel.**—Between Prinkipo Bank and the shoal water extending south from Maltepe Burnu is a 6-fathom (11.0 m.) channel ¾ mile wide, with several 5-fathom (9.1 m.) patches in it.

To pass through this channel and northward of Prinkipo Bank keep Pita Island summit open north of Halki Island, bearing 268° which will lead in 5 fathoms (9.1 m.).

Around the other shores of Prinkipo 5 fathoms (9.1 m.) will be found 200 yards offshore, excepting off the northern part of the west shore, where that depth is nearly 400 yards from the shore.

**Andirovitha,** a small island 180 feet (54.9 m.) high and ½ mile in length, lies east of Prinkipo, from which it is separated by a channel 1,200 yards wide and with a least depth of 6 fathoms (11 m.).

A patch of 4½ fathoms (8.2 m.) lies 400 yards northward of Andirovitha, which is otherwise fairly steep-to.

**Niandro** (*40° 49′ N., 29° 07′ E.*) is a rocky islet 85 feet (25.9 m.) high 1 mile southward of Prinkipo. A rocky bank with from 4 to 30 fathoms (7.3 to 54.9 m.) extends off the north and east sides 300 yards.

**Halki,** 445 feet (135.6 m.) high, the next island northwestward of Prinkipo, is 1½ miles long by ¾ mile wide and fairly steep-to on all sides except to the eastward. It has a number of dwarf pines on it, but is otherwise bare and rocky. The town lies on the eastern side and is much smaller than the settlement at Prinkipo.

The Turkish naval college is situated at the eastern point of the island. On the rounded elevation which forms the northern portion of the island is a theological college, and on the dip of the hill north of the Cham Liman is a large secular college. There is a telegraph station on the island.

On the south side of the island is a picturesque little bay called Cham Liman, in which there is room for two ships to moor in 8 fathoms (14.6 m.), but it is completely open to the south.

**Halki Channel,** between Prinkipo and Halki, is 1,300 yards wide, but much narrower by the shoal banks which project from either island, and though there is a 5½-fathom (10.1 m.) channel, it is so narrow that without buoys a ship can not make certain of carrying more than 4½ fathoms (8.2 m.) through, as there is no leading mark. At the latter depth there is a passage of 600 yards wide, to pass through which it is only necessary to keep in mid-channel.

**Antigone,** lying west-northwestward from Halki, is a square-shaped island 535 feet (163.1 m.) high, ¾ mile across, and fairly steep-to on all sides, with a little pine wood on its summit and along the southern spur eastward. Otherwise it is rocky and bare. The south coast is a fine cliff 500 feet (152.4 m.) in height. On the east side and just south of the village a rough mole projects 200 yards from the shore and protects the landing pier from southwest gales.

**Pita,** a bare rocky islet between the northern points of Halki and Antigone 60 feet (18.3 m.) in height, has anchorage and a navigable channel on both sides of it. Between the south end and the mole stretching from Antigone is a channel 350 yards wide and 8 fathoms (14.6 m.) deep, and between Halki on the southeast and Antigone and Pita on the northwest is an 8-fathom (14.6 m.) passage 500 yards wide. This latter is a good anchorage, with stiff mud holding ground with a surface of coralline.

**Proti,** 375 feet (114.3 m.) high, 1 mile north of Antigone, is similar in size and shape, but is perfectly bare. The settlement is the smallest of those in the Princes Islands. Shoal water nowhere extends over 250 yards from the coast, and the channel between Proti and Antigone is wide, deep, and clear.

**Plati,** a rocky islet 150 feet (45.7 m.) high, and ¼ mile in length, lies 2½ miles west-southwestward from Antigone. It has been cultivated and there are still a good many fruit trees on it. A castellated residence on the summit is now falling into decay, but looks imposing at a distance. The island is steep-to excepting at the eastern end, where a shoal extends off for 150 yards, and there is good landing in an artificial camber at the eastern point.

**Oxia,** nearly 1 mile northwestward of Plati, is a steep mass of marble 300 feet (91.4 m.) in height, and the resort of the sea birds of the vicinity, which breed here in great numbers. A bank with 5 to 10 fathoms (9.1 to 18.3 m.) extends 300 yards off the northern and eastern sides.

**Current.**—The current generally sets to the southwestward in all the channels which Princes Islands form with each other, but it then turns and sets slowly to the northwestward near the shore between Tuz and Fanar Points.

**DIRECTIONS.**—The navigation of the Sea of Marmara offers but few difficulties, the weather being generally fine. A steamer, or sailing vessel with a fair wind, on leaving the Dardanelles may from abreast Eski Fanar steer a course east-northeastward to clear Heraklitsa Burnu. No vessel should try to pass within 1 mile of the shore, as the dangerous bank of Dohan Aslan, on which many vessels have struck, extends ¾ mile from the land. In thick weather it would be advisable not to stand into less than 12 fathoms (21.9 m.) water in this vicinity.

By night, when Hora Light is sighted, care should be taken when it is approached within 10 miles not to bring it eastward of 46°, as Heraklitsa Burnu is low and dangerous.

If the wind should blow hard from northeast even a fast and powerful steamer should not hesitate to close the coast of Europe, where there would be less sea; by doing this time would be gained and the passage shortened.

Vessels bound to Constantinople during the day generally make the land at San Stefano Point, which is low and of a red color, and may be distinguished by the houses on it and the lighthouse to the eastward. To vessels approaching from the westward Constantinople is hidden by San Stefano Point. By not bringing San Stefano Point Light to bear eastward of a 70° bearing a vessel will not approach the land which lies westward of San Stefano Point within 3 miles.

After passing San Stefano Point, to which a berth of 1 mile should be given, steer for Seraglio Point, but take care to avoid the bank southward of it.

**Sailing vessels,** when past Hora Point, instead of steering for San Stefano Point should keep to the northern coast, partly to avoid the current, but chiefly either to be in a position to work up along that coast if the wind should veer to northeastward or to anchor if it should blow hard from that direction.

If the weather should appear threatening, with the wind northeasterly, and a vessel has not advanced farther eastward than Hora Point, do not hesitate to bear up for Gallipoli; but if as far on as

Rodo she might anchor on the coast with north and northeast winds. If, on the other hand, the wind is more eastward, it would be preferable to keep away to the southward and wait till the gale is over in one of the good anchorages which have been described with that area.

Vessels engaged in the Black Sea trade usually prefer in winter the channel southward of Marmara Island because south and southeast winds are then more frequent, and in the case of adverse winds they are close to good anchorages; but in the summer season the north channel is the best. Large vessels in all seasons should keep in the north channel, and in case of bad weather they can easily run for one of the good anchorages to the southward.

**A sailing vessel with a foul wind.**—In a fair working breeze a vessel should always keep to the coast of Europe northward of a line leading from the north point of Marmara Island to Gallipoli Light.

Dohan Aslan Shoal (*40° 30′ N., 26° 52′ E*).—A vessel must tack short here and not approach within 1 mile of the shore.

Boz Bank, off Yuriji or Boz Burnu, should not be approached within ¾ mile. The coast in the vicinity has a steep appearance. Beyond this the shores are free from dangers outside ½ mile.

Heraklitsa Burnu is dangerous at night, as it is low and the hills rising at the back mislead the judgment as to distance. Hora Light can be seen over Myriophyto Point, and many vessels trusting to this have been wrecked on the point. A vessel should tack before Hora Light bears 45°.

Myriophyto Point is of a similar character to Heraklitsa, but does not seem so dangerous.

In turning to windward in clear weather between Rodosto and San Stefano Point a vessel should favor the coast of Europe, as often in fine weather the wind will be more northerly inshore so as to enable her to make good easting, and she will also find the current there much weaker. In foggy weather and during the night a good lookout should be kept when approaching the land and the lead kept constantly going. Do not shoal to less than 17 fathoms (31.1 m.) water. San Stefano Point Light should not be brought to bear eastward of 70° true, which will be 3 miles from the shore westward of the point. In passing San Stefano Point give it a berth of 1 mile.

In working along the shore between San Stefano Point and Seraglio Point with the wind from northeastward there is a great advantage in standing as close in as possible on the starboard tack, not only to take advantage of the eddy current but also because the sea is smooth. A vessel can stand well in to the edge of this bank, which

600 yards seaward has a depth of 3 fathoms (5.5 m.), by tacking when the trees on the conical mountain of Bulgurlu, which lies 3 miles to the eastward of Skutari, come in range with the west angle of Selimiye Barracks, Skutari, bearing 64°. This restriction should continue only till abreast of the Seven Towers, when she may stand within 600 yards of the walls, nearly as far as Seraglio Point. Here a vessel may if desirable anchor and await a fair wind, or proceed as described under directions for Constantinople. (See page 148.)

# CHAPTER IV

## THE BOSPORUS

**General description.**—See page 22.

**GOLDEN HORN (the harbor of Constantinople)** (*41° 01′ N., 28° 59′ E.*) is a good harbor, always crowded with vessels of all nations. It was known by this name in the time of the Greek Empire, being then the center of the commerce of the world, whose produce it received. It extends 3 miles in a northwesterly direction and then 1 mile north and northeast. Its breadth varies from 400 to 800 yards from its mouth up to its northern extremity, which forms a basin named in Turkish Kiaghid Khane, or the Sweet Waters of Europe, and into which flows a small stream named the Lykus.

Two bridges cross the Golden Horn. The inner is no longer used, having been damaged by a storm in 1921 and is permanently open to the passage of vessels. The outer, known as the Galata Bridge, is opened for one hour daily.

The port of Constantinople includes all of the Bosporus.

**Approach.**—A vessel in approaching Constantinople from the Sea of Marmara, on passing San Stefano Point will quickly observe on the port bow numerous domes and spires surmounted by the golden crescent. On a nearer approach the south side of the city opens out with its numerous mosques and crowded houses painted in various colors, the whole mass rising in the form of an amphitheater from the middle of a forest of cypress. Near its western angle is seen the Tower of Marmara on the margin of the sea, and the famous State prison, called the Castle of the Seven Towers.

On the Asiatic coast also will be seen the mountains of Kaish Dagh and Aidos Dagh, situated about 3 miles from the shore east of the Princes Islands, which serve as marks for vessels coming from the Sea of Marmara, and northwestward of them rises Mount Bulgurlu or Chamlija, at the foot of which lies the large town of Skutari, with a forest of cypress surrounding a vast cemetery.

**Constantinople Light,** an occulting white light, 118 feet (36 m.) above the sea, and visible 16 miles, is exhibited from a white tower 127 feet (38.7 m.) high, 0.3 mile northeastward of Seraglio Point. (See Light List.)

**Shore.**—The quay which skirts the eastern wall of the Seraglio on the Bosporus is nearly ¾ mile in length from north to south; and from the termination of the mud bank at Seraglio Point, its south extremity, where there are only 12 feet (3.7 m.) water 300 yards from the point, the shore is free from danger outside the distance of 200 yards, so that a steam vessel may pass very close. The current at this spot sometimes attains a velocity of 4½ knots.

**Outer commercial port.**—The outer commercial port extends from the eastern entrance of the Golden Horn (a line from Old Seraglio Point to the Tophane Arsenal) to the first bridge over the Golden Horn, a distance of about 1,800 yards. There are quays on both sides. It is buoyed for merchant vessels, which load and discharge their cargoes into lighters.

There is at present accommodation for about 30 vessels between the buoys. The principal regular lines of steamers have certain buoys assigned to them for their sole use, and it is only at the four northeastern buoys that chance steamers may make fast, and that only for 24 hours. For this temporary accommodation no charge is made.

**Wrecks.**—The wreck of a lighter lies sunk in 20 fathoms (36.6 m.) of water about 950 yards 116° from Galata Tower.

The sunken wreck of a yacht lies about 1,600 yards 75° from Galata Tower.

**Inner commercial port.**—The inner commercial port lies between the two bridges over the Golden Horn and is about 1,100 yards in length. It is used chiefly by small sailing craft arriving with local produce from the Black Sea, the Sea of Marmara, and the Aegean Islands. The inner commercial port is also used by lighters and barges awaiting their turn at the customs at the outer commercial port. The depths are 12 and 13 fathoms (21.9 and 23.8 m.) along the northern quays, 20 to 23 fathoms (36.6 to 42.1 m.) in the middle, and 10 to 13 fathoms (18.3 to 23.8 m.) off the southern quays, over a mud bottom.

**Naval port.**—The naval port extends from the second bridge a mile or so up the Golden Horn, past the Turkish Ministry of Marine. The water in the so-called naval port is sufficiently deep to permit the entrance of the largest naval vessel. On the southwestern side there are no quays, but along the shore a number of small warehouses have been erected. On the northeastern side are the buildings of the Ministry of Marine, the naval docks, etc.

**Stambul Liman.**—Above the Golden Horn lies Stambul Liman Reach, having a depth of 2 to 7 fathoms (3.7 to 12.8 m.), extending as far as the village of Eyub, which stands on its right bank and near a palace.

After passing the village of Eyub is the Kiaghat Basin, the boat channel to which is marked out by stakes, beginning abreast a large barrack on the right shore.

**Port regulations.**—Except in case of unforeseen accident, vessels are forbidden to anchor between the new bridge and a line drawn from Seraglio Point to the outer line of buoys without a written authorization from the captain of the port.

Except in case of fire, no tugboat, local passenger boat, or trading vessel is permitted to be under way between one hour after sunset and half an hour before sunrise.

**Pratique.**—All vessels bound to Constantinople should notify the port authorities 24 hours in advance in order that berths may be allotted.

Vessels arriving must obtain pratique at the control stations; if from the Sea of Marmara off Tophane, on the northern side of the entrance to the Golden Horn, and if from the Black Sea off Kavak Point (*41° 10′ N., 29° 05′ E.*)

**Pilots** are embarked at the control stations. Vessels leaving must embark a pilot at their anchorage or at the quay. See also paragraph "Pilot and tug service in Turkish waters," page 29.

**Towboats.**—There are numerous tugs available. Two floating steam fire engines are held in readiness to render assistance at once. One engine is stationed outside the new bridge, the other is kept between the bridges.

**Directions.**—A steam vessel, after rounding the shoal off Seraglio Point, may approach within 200 yards of the quays, guarding against the current, which has a velocity of 4½ knots; but owing to the large number of vessels generally assembled in this locality it is preferable to keep the Asiatic shore on board until abreast Leander Tower, then steer across to the European shore.

A sailing vessel with a fair wind, having passed San Stefano Point, should close the shore of Europe in order to avoid the current and profit by the eddy, and also be in a position to anchor under the walls of the city if the wind should fall light or calm.

With a fair wind she may, preserving a depth of not less than 5 fathoms (9.1 m.) water, close the land between the Seven Towers and Seraglio Point to within 600 yards, and after rounding the shoal off Seraglio Point, to which point a berth of 1,200 yards should be given, should keep nearly in mid-channel, which is eastward of the strength of the current, until the harbor of Constantinople is well open. Then, edging across the current for the artillery quay at Tophane, she will be able to gain an anchorage in the port. By acting thus a vessel will avoid the strength of the current, which sets onto Seraglio Point, and will have time to stow her sails and pick out a good berth in the port.

A sailing vessel with a foul wind, having worked from San Stefano Point to Seraglio Point during daylight, should take a tug or anchor either off Seraglio Point or off the Asiatic coast and await a fair wind.

The anchorages along the Asiatic coast from 1 mile north of Fanar Point to Leander Tower are generally preferable to that under the walls of Constantinople for vessels going farther up the Bosporus, as it often happens that strong south and southeast winds reach this anchorage while it is calm on the opposite shore. Also there is no sea with northerly winds, and a vessel will lie sheltered from the currents of the strait.

**CONSTANTINOPLE** (*41° 00′ N., 28° 57′ E.*), situated at the southern end of the Bosporus, has spread far beyond its old boundaries and now includes Galata, Pera, Tophane, and other suburbs along the Bosporus, and to the southward the city limits extend as far as San Stefano on the European side and Kartal on the Asiatic side, including the picturesque settlements on the Princes Islands. The population, including the suburbs, may be estimated at 1,106,000 persons.

Constantinople proper, also called Stambul or Istambul, is built on the triangular promontory which forms the west side of the entrance to the Bosporus, and, like ancient Rome, covers seven hills. It is thus surrounded by water on all sides except the west, where the city wall, now in a bad state of repair, extends from shore to shore. Its appearance from without is extremely picturesque and imposing, with its hundreds of mosques, cupolas, and minarets interspersed with lofty cypresses. There are now street-railway and electric-light services, and the sewage system is being improved and extended.

The Old Seraglio occupies a large area at the eastern extremity of the promontory. It is surrounded on its north, south, and west sides by high gray walls. The extremity of the point is bare, but the remainder of the ground is covered with buildings, everywhere relieved by clumps of cypresses.

Pera stands, with the towns of Galata and Tophane, on the rising ground opposite Constantinople. Its houses are irregular and the streets narrow, and it is bounded by large cemeteries and promenades planted with cypresses. Here the ambassadors of foreign powers reside.

Galata, to the south of Pera, is an old town built by the Genoese. Here merchants of all nations have established their offices and warehouses. Its lower part is unsanitary and fevers are prevalent.

Halfway up Galata Hill is a remarkable white round tower which has the appearance of a large minaret. From its top the view embraces the Bosporus and all Constantinople, and from there the alarm is given in case of fire.

Tophane lies northeastward of Galata along the bank of the Bosporus. The greater part is occupied by the Turkish Army.

**Consuls.**—The United States is represented by a consul general and staff.

**Quays.**—The Galata quays, opened in 1895, consist of a narrow strip 810 yards long, extending from the new bridge to the Tophane Arsenal, having depths of 36 feet (11.0 m.) alongside in the center, 30 feet (9.1 m.) at their western end, and 24 feet (7.3 m.) at the eastern end. These quays are chiefly used by tugs and by the steamers engaged in the local traffic.

**Dry docks.**—See Appendix I, page 422.

**Supplies.**—In normal times about 15,000 tons of coal was kept in stock at the various depots and was put on board lighters. There are special coaling buoys, and it is very rarely, even in severe southwesterly gales, that coaling is interrupted. Coal is loaded in baskets at a maximum rate of 300 tons per day. If vessels coal at Therapia or Beikos Bay an extra charge is involved.

Fuel oil is loaded by pipe line at the wharf of an oil company. The usual amount on hand is about 10,000 tons.

Water is supplied by water boat at a maximum rate of 2,000 tons in 24 hours. Ships' chandlery and engineers' supplies can be obtained, and fresh provisions are plentiful.

**Trade.**—The chief manufactures are those of silk and cotton fabrics, firearms, morroco leather, saddlery, horse trappings and shoes, and other articles of ordinary use and consumption; also meerschaum pipes.

The imports consist of manufactures of all kinds, colonial produce, coal, iron, lead, copper, tin, earthenware, glass, timber, etc.; and the exports grain, wool, cotton, mohair, wood, silk, opium, tobacco, goatskins, rags, bones, drugs, attar of roses, carpets, etc.

The fisheries of Constantinople are important; the harbor and adjacent sea abound with shoals of tunny and swordfish, and the Sweet Waters with a profusion of fresh-water fish.

**Shipping.**—During the five years ending December, 1924, the number of vessels calling at the port of Constantinople varied between 3,809 in 1922 and 4,898 in 1924, but their carrying capacity steadily enlarged, as shown by the tonnage figures, which increased annually from a total of 2,472,815 in 1920 to 7,160,573 in 1924.

**Communication.**—The communication by steamer with all the chief ports of the Mediterranean and Sea of Marmara may be considered as almost constant. Rail with all parts of Europe via Adrianople; and from Haidar Pasha, on the Skutari side of the Bosporus, to Izmid, Angora, Konia, and Eregli. There is a short subterranean railroad up the steep incline from Galata to Pera; trains run every few minutes. Telegraphic communication with all parts by land line and cable; cables are laid to Nagara, Constantsa, and Odessa.

Steam ferry services run from Galata Bridge to the Princes Islands, to Skutari and Kadiköi, to various places in the Bosporus as far as Buyukdere, and up the Golden Horn as far as Eyub.

Caiques of graceful appearance are constantly gliding about the Bosporus; and their light, sharp, and swift build enable them easily to stem the currents. Their hire is moderate, and under all circumstances they are preferable to ships' boats. These caiques rarely carry lights at night.

**Radio.**—There is a radio station, call letters FOSM, at Osmanie, 4 miles from Constantinople. It is owned by the Turkish Government and handles commercial messages.

**Hospitals.**—The hospitals include the American, British, German, Italian, and municipal hospitals.

**Winds and weather.**—See Meteorological table, Appendix III. See page 34.

**EUROPEAN SHORE—Ortaköi.**—Orta Point, about 2 miles northeastward of Tophane Arsenal, is easily distinguished by a white mosque on the extreme point. From the point a small spit projects about 30 yards, which would have been scarcely worth mentioning but that vessels usually hug that point. The shore between the arsenal and the point is covered with magnificent houses, besides the two large villages of Beshik Tash and Fundukli; the southwestern half of this shore is fronted by a narrow bank marked by piles.

Water may be obtained at Ortaköi from a fountain, which also supplies the population.

**Wrecks.**—The wreck of a lighter lies sunk in 24 fathoms (43.9 m.) of water 1,082 yards 234° from the mosque at Ortaköi. A small float with a red flag marks the position of the wreck.

The wrecks of two vessels lie sunk 900 yards 158° and 750 yards 147°, respectively, from the mosque at Dolma Bagche.

**Anchorage.**—There is, except within the area of foul ground referred to below, anchorage all along this shore in 10 to 17 fathoms (18.3 to 31.1 m.), and vessels can either moor or remain at single anchor. Care should be taken not to anchor near the line where the two currents meet, as they produce violent reactions which sheer vessels in all directions and may cause collisions. Though it is easy to perceive on the surface of the water the boundary line which separates the permanent current from the eddies, it is varying its position from hour to hour, and if the anchorage is crowded it is sometimes very difficult to avoid dropping the anchor near the dividing line. Vessels bringing up in the Bosporus should therefore always moor. The holding ground is mud.

**Caution.**—Care must be taken with the cables both in anchoring and weighing, as there are many stray anchors on the bottom. Vessels are constantly running into or drifting on one another. A sharp lookout must be kept, therefore, in squally weather, especially on the smaller craft, which seem always to be at a short stay.

The whole of the area between bearings 137° and 154°, from Dolma Bagche Mosque up to a distance of 760 yards from it, is foul and is indicated by a danger line on the charts.

**Defterdar Burnu** (*41° 03′ N., 29° 02′ E.*).—At Defterdar Burnu the central current is much weakened, and is often driven back by the countercurrent from Constantinople, which reaches as far as this point and then turns off into the general southwest current. Sailing vessels, however, frequently find it difficult to pass with light southerly winds, and, as at Arnaut Point, to the northward, are obliged to warp round it.

**Duimi and Kuru Banks.**—About ½ mile northward of Defterdar Burnu are two banks 300 yards apart, lying nearly parallel to the shore. Duimi, the southernmost, over which the depth is 3 feet (0.9 m.), is 200 yards long north and south, 100 yards wide, and lies 100 yards from the shore. There is a depth of 7 to 10 fathoms (12.8 to 18.3 m.) between the bank and the shore, but no safe passage. Kuru Bank, formerly a shoal with a depth of 4 feet (1.2 m.), but now above water, is nearly the same size as Duimi and lies abreast the village of Kuruchesme, 200 yards from the shore. As there are depths of 7 to 12 fathoms (12.8 to 21.9 m.) between the bank and the quays a vessel may pass inside it, though at all times it will be more prudent to keep outside, unless wishing to make fast to the shore. The southern extremity of Duimi Bank is marked by a lighthouse. Kuru Bank is occupied by a coal depot.

There is anchorage between the two banks, and generally many sailing vessels are at single anchor off here, waiting for a fair wind to get farther north.

**Duimi Bank Light.**—A flashing green light, 23 feet (7.0 m.) above the level of the sea, visible 3 miles, is exhibited from a white iron support on a masonry base located between Defterdar and Kuruchesme villages on the west side of the strait. (See Light List.)

**Coast.**—Between Defterdar Burnu and Arnaut Point there is a zone of eddies setting northward, which sometimes near the shore are strong, but all of which turn off on reaching Arnaut Point and unite with the main current. Small vessels frequently land their crews and track round the point. There is anchorage under the point in 14 to 17 fathoms (25.6 to 31.1 m.), sheltered from the current but within 200 yards of the shore.

There are good anchorages off the quays of the different villages which stand on this shore, the largest of which is that of Kuruchesme, near which is a palace. Here vessels are protected from southerly winds, and can discharge alongside at all times of the year. There are warehouses with considerable storage space and an automobile truck line for the delivery of goods to all parts of Constantinople.

**Bebek Bay,** between Arnaut Point and Rumeli Hissar, is deep, and as the current never enters it would afford some facilities for navigating the Bosporus were it not obstructed by a bank. This bank, over which the depth is only from 3 to 6 feet (0.9 to 1.8 m.), extends into the bay from abreast the quays on the north side of Arnaut Point, about 600 yards to northeastward. Its termination is marked by a white stone pyramid, which also serves for warping.

**Bebek Light.**—A flashing green light, 15 feet (4.6 m.) above the sea, visible 3 miles, is exhibited from a white masonry pyramid located on the extremity of the bank. (See Light List.)

**Rumeli Hissar.**—The point of Rumeli Hissar, about 1,200 yards northeastward of Bebek, is overlooked by a hill on which still stand some towers and an old fortified castle. It was from this point that Darius contemplated the passage of his army, and from this also the Goths and the Crusaders crossed into Asia. The conquering Turkish Army under Mahomed II also crossed into Europe here immediately before the siege and fall of Constantinople.

With light southerly winds vessels can run up to Rumeli Hissar nearly as far as the castle, southward of which they can either make fast alongside the stone quay or anchor in about 8 fathoms (14.6 m.) very near the shore.

**Rumeli Hissar Light.**—A flashing green light, 36 feet (11 m.) above the level of the sea, visible 3 miles, is exhibited from a white iron column on a square white tower located on the wall of the fortress. (See Light List.)

**Devils Current.**—In this part of the strait, which is only 800 yards wide, the current attains a velocity of 5 knots and is known as Devils Current.

**Baltaliman** is a small village nearly halfway between Rumeli Hissar and Stenia Bay.

**Stenia (Istenie) Bay,** small and of a circular form, is sheltered from all winds and currents. About 100 yards from its western side there is a depth of 5 fathoms (9.1 m.) shoaling toward the shore. Its entrance is 200 yards wide, and although the bay has a depth of 6 to 14 fathoms (11 to 25.6 m.) vessels seldom use it, but prefer working up in the eddy and anchoring under Kiobashi Point, the latter being a better berth from which to weigh.

**Dry dock.**—See Appendix I.

**Kiobashi Point—Yeniköi Bank** (*41° 07′ N., 29° 04′ E.*).—From this point a bank having a depth of 5 fathoms (9.1 m.) on its outer edge projects 300 yards from the shore. It begins northward of the point and borders the shore to the southward as far as Stenia Bay; and on this bank, about 200 yards from Kiobashi Point and 125 yards from the shore, lies a sunken rock having a depth of from 1 to 2 fathoms (1.8 to 3.7 m.).

Rumeli Hissar Point in range with Kanlija Point, 201°, leads outside Yeniköi Bank.

**Anchorage.**—A flat extends 200 yards outside Yeniköi Bank on which vessels may anchor in 5 to 10 fathoms (9.1 to 18.3 m.) sheltered from northerly winds, also from the channel current, which, by its divergence from Kiobashi Point toward the coast of Asia, causes a countercurrent that runs nearly up to the point.

**Light buoy.**—A white buoy exhibiting a flashing green light 10 feet (3 m.) above the water, visible 3 miles, is moored on the edge of Yeniköi Bank. (See Light List.)

**Therapia Bay** (*41° 08′ N., 29° 03′ E.*) is small, but sheltered from all winds. It has a depth of 6 to 9 fathoms (11 to 16.5 m.), but accommodates only a few vessels, which generally make fast alongside the quays. A vessel entering must avoid being set to the southward, and should therefore hug as much as possible the northern shore, for the current, which is but slightly felt in the bay, sets toward a sunken rock off the little mole which forms the southern entrance point, and shoal water also extends within the bay from its southern shore.

During summer nearly all the available space in this little bay is occupied by the stationnaires attached to the different embassies in Therapia. Vessels seeking temporary anchorage should anchor on the opposite shore, either in Beikos Bay or off Sultans Valley.

The summer residences of the French and Italian ambassadors lie between Therapia Bay and Kirich Burnu, and are built near the broad quay that fronts the Bosporus. The French palace, which is red in color, is the northernmost of the continuous line of houses north of Therapia Bay. The Italian palace stands on the quay southward of the French palace.

**Kirich Burnu Light.**—A flashing green light, 26 feet (7.9 m.) above the level of the sea, visible 3 miles, is exhibited from a mast on a white house located about 1 mile 333° from Therapia. (See Light List.)

**Buyukdere Bay** is formed between Mezar Burnu and Kirich Burnu, in front of a magnificent valley. It affords shelter from all winds and is the best anchorage in the Bosporus. The town occupies the north shore and contains the ordinary summer residences of the ambassadors, consuls, and rich merchants of Constantinople, who live there in magnificent villas. A smaller village, named Kechliköi, lies on the southwest shore. A minaret stands at the head of the bay.

**Conspicuous objects.**—The police barracks, a very conspicuous white house with tower and flagstaff, stands on the hillside above Buyukdere. Kirich steamer pier, which has a shelter on its outer end, forms a good mark.

A 5-fathom (9.1 m.) patch lies about in the middle of the bay.

**Anchorage.**—Vessels may anchor in any part of Buyukdere Bay, in 18 to 24 fathoms (32.9 to 43.9 m.) at its entrance, 10 to 12 fathoms (18.3 to 21.9 m.) in the middle, and in 4 to 7 fathoms (7.3 to 12.8 m.) at its head, over mud and fine sand. The best and most convenient anchorage is about 600 yards southward of the town of Buyukdere in about 8 fathoms (14.6 m.) with the minaret at the head of the bay bearing 278°. Vessels in picking up an anchorage often find so many craft riding in the bay that they can not choose a convenient berth.

**Current.**—The main current from Mezar Burnu increases in strength, and, passing Buyukdere Bay without entering it, sets directly on to the battery at Kirich Burnu and also over Englishman Banks. Although the current does not enter the bay, yet there is always in it a weak eddy, which becomes very irregular and changeable when the current in the channel is strong, for it then sometimes sets up to Kirich Burnu and to the northward of the village, and even beyond Mezar Burnu and Yeni Mahalle; and it has been known to reach as far as Buyuk Bay in the zone where the water is generally slack.

**Quarantine.**—There is a pratique office here which is used only by sailing vessels.

**Marine railway.**—See Appendix I.

**Water supply.**—West of Buyukdere, in the forest of Belgrade, lie the reservoirs (or bends) which furnish Constantinople with water. These, with their aqueducts, were commenced by Constantine the Great, and were added to and replaced by successive emperors and sultans.

The forest, principally composed of chestnuts and oaks, is the eastern portion of a vast wooded area stretching to the northwest. The part available for catching the water covers ground much broken and cut up into valleys, the lower ends of which when dammed form the reservoirs. Of late years the forest has been much reduced by want of care in preserving it from fires, and the same lack of supervision has permitted the dams, aqueducts, and watercourses to fall out of repair. The solidity and magnificence of these works, built in some instances entirely of marble, attest that sultans as well as emperors fully recognized their immense importance.

The aqueduct of Ibrahim, which crosses the head of Buyukdere Valley and carries water into Pera, is visible from the Bosporus and is the latest of their structures. It collects water from four reservoirs near the village of Bagcheköi, at the edge of the forest.

The Great Reservoir is near the village of Belgrade, about 5 miles from Buyukdere and well in the forest. A well-macadamized road leads as far as the village.

Three other reservoirs assist in the supply of Stambul, and their water is carried over the two magnificent aqueducts of Constantine and Suliman near the village of Burgas, and that of Justinian farther southwest, and so round the head of the Golden Horn into the town.

**Mezar Burnu** (*41° 10′ N., 29° 03′ E.*) is bordered by a shoal bank which extends 100 yards seaward.

Northward of Mezar Burnu the coast forms a small bay, in which anchorage free from the main current may be obtained in depths of 10 to 20 fathoms (18.3 to 36.6 m.). Here are seen the villages of Sariyar and Yeni Mahelle. Between these two places a small stream named Guldere empties into the strait.

**Telli Point.**—On Telli Point stands a ruined battery and a conspicuous yellow house.

**Rumeli Kavak** is a small village in a pretty valley just opposite Kavak Point in Asia. On the hill above are the traces of an old Genoese castle and at the waterside is a battery.

**Dikili Rocks.**—Abreast Rumeli Kavak and nearly 400 yards from the shore lies a cluster of rocks 200 yards long northeastward and southwestward and 150 yards broad. The south end of Dikili Rocks is a little north of a line joining the two large forts which stand beneath the castles of Rumeli Kavak and Anatoli Kavak. Some of the rocks are nearly awash; others break in rough weather. A good lookout should always be kept for them, especially during the night, as they are very dangerous.

Between Dikili Rocks and the shore there is a passage having a depth of 9 to 13 fathoms (16.5 to 23.8 m.).

A vessel may anchor near the southwest end of Dikili Rocks in 8 to 10 fathoms (14.6 to 18.3 m.) water. There is deep water within a short distance of the rocks.

**Beacon.**—A beacon, consisting of a red iron staff on a concrete base surmounted by a spherical cage, marks Dikili Rocks.

**Telegraph cable.**—A telegraph cable crosses the strait from Rumeli Kavak to Kavak Point.

A telephone cable crosses the strait about 1,650 yards southwestward of the above between the cliffy point 700 yards southwestward of Telli Fort and the old pier southward of Majar Kalessi. Each end is marked by a board with the words " Cable Telephonique " and a reversed anchor.

Vessels are forbidden to anchor in the neighborhood of these cables.

**Coast.**—From Rumeli Kavak the coast extends nearly in a straight line to Buyuk Bay and is bordered by a shoal bank which extends about 125 yards into the strait, and in some places bordered by steep rocks of considerable height lying close to the shore. A weak current sets northward along this part of the coast.

**Buyuk Bay.**—In calm weather there is occasional anchorage between Rumeli Kavak and Buyuk Bay 300 yards from the shore in 8 to 12 fathoms (14.6 to 21.9 m.), but the best berth is southward of a powder magazine and a battery which stand on a hill forming the south point of the little bay of Buyuk, to the head of which no large vessel can go, as there is only 11 feet (3.3 m.) water. A flat extends for upward of 400 yards into the channel from the northeast point of this bay, on the outer edge of which there is a depth of 5 fathoms (9.1 m.).

**Signal station.**—There is a signal station on the northern point of Buyuk Bay. The station is in telephonic communication with Constantinople.

**Karibje Point** (*41° 12′ N., 29° 06′ E.*).—The coast between Buyuk Bay and Karibje Point maintains the same character, and is fringed by the shoal bank before mentioned and which extends 125 yards into the strait. On the outer edge of the bank there is a depth of 5 fathoms (9.1 m.).

On Karibje Point is an antiquated stone castle, and on a hill projecting northeastward lies the large battery of Karibje, round which are seen a few barns and a small village.

The coast northward of Karibje Point forms a bight open to the northeast and fringed by a shoal bank in which the current generally sets northward, though weakly. In fine weather a vessel may anchor in this bight 800 yards from the shore in about 10 fathoms (18.3 m.) water.

**Papas Point.**—On a hill of moderate height, named Papas Point, 1,800 yards northward of Karibje Point, stands a battery.

Cape **Rumeli**, on the northwest point of the European shore of the entrance to the Bosporus, on which stands the lighthouse and the village of Fanaraki, is surrounded by a belt of high rocks with steep faces, on one of which, named Kyani Island, is still seen the remains of an altar dedicated to Cæsar Augustus. Two hundred yards eastward of the island there is a depth of only 3¾ fathoms (6.9 m.).

A vessel may anchor during southwesterly winds in fine weather or in a calm 800 or 1,000 yards southeast of the island in 15 fathoms (27.4 m.) over mud bottom.

**Rumeli Light.**—A fixed white light, 190 feet (57.9 m.) above the sea, visible 18 miles, is exhibited from a white circular stone tower located about 600 yards south of the battery.

**Fog signal.**—The fog signal is a siren. (See Light List.)

**ASIATIC SHORE—Skutari** (*41° 01′ N., 29° 01′ E.*)—**Leander Tower.**—The seashore of Skutari is bordered by a sand flat which extends from 300 to 600 yards from the shore and on the outer edge of which there is a depth of 5 fathoms (9.1 m.). At the extremity of a rocky ledge extending 200 yards from the west point of Skutari is a rock nearly awash, on which is built a square white tower with a gallery, named Leander Tower, but locally known as Guz Couli (Maiden's Tower), at the foot of which is a small battery.

**Skutari Light.**—A flashing red light, 36 feet (11.0 m.) above the sea, visible 4 miles, is exhibited from a white iron column on a wall near Leander Tower. (See Light List.)

**Foul ground** exists 1,140 yards 291° from Leander Tower. The position on the charts is encircled by a danger line.

An obstruction, probably a scrap heap, exists about 984 yards north of Leander Tower Light.

**A rock** with a depth of less than 6 feet (1.8 m.) lies 100 yards north-northeastward from Leander Tower; a patch of 2¾ fathoms (5 m.) lies northward of it as charted.

**Wreck—Light.**—A red light shown from a mast of a wreck which lies sunk at about 1½ miles southward of Leander Tower.

**Pilots.**—Skutari is a pilot station. See paragraph "Pilot and tug service in Turkish waters," page 29.

**SKUTARI.**—The town of Skutari, or Uskudar, surrounded by numerous gardens and cypresses, stands on the Asiatic bank of the Bosporus opposite the entrance to the Golden Horn. Its streets are wider and offer a more lively appearance than those of Constantinople, and it is the rendezvous of caravans arriving from the center of Asia and the point of departure of those going to Mecca. The position is admirable and the view finer than at Constantinople, especially from Mount Bulgurlu, which lies to the eastward of the town. A vast cemetery lies back of the town, called the Dead Quarter, which is equally used by the Turks of Constantinople.

The population numbers about 35,000, of which the greater portion are employed in the production of silk.

**Supplies.**—Water is obtained in abundance and vessels lying at Constantinople are supplied during the warm season.

**Communication.**—There is a telegraph station.

**Coast.**—A short distance southward of Skutari stands Selimiye Barracks, a large square yellow building flanked by four towers at its angles. Southward of the barracks is the Turkish School of Medicine, a very conspicuous building.

Northeastward of Skutari are the two villages of Kuzgunyuk and Istavros. Eastward of the latter and near the shore is the white marble palace of Beyler Bey.

The coast from Leander Tower to Kandilli Point is bold and has deep water within a few yards of the shore. This side of the channel is rarely frequented by vessels going northward, as there are neither eddies nor anchorages in case of calms or a sudden shift of wind. Southward of Kandilli and in the little bay of Vaniköi a narrow zone is found where the water is slack.

**Kandilli Bank.**—Off the point of Kandilli a shoal bank on the outer edge of which there is a depth of 5 fathoms (9.1 m.) extends 100 yards into the strait.

**Kandilli Point Light** (*41° 04′ N., 29° 03′ E.*).—A flashing red light, 90 feet (27.4 m.) above the sea, visible 4 miles, is exhibited from a white iron mast 41 feet (12.5 m.) high located near the extremity of the point. (See Light List.)

**Anadolu Hissar.**—Between Kandilli and Anadolu Hissar is a bay the shores of which are steep except near the latter place, where a fringing bank with 9 feet (2.7 m.) of water extends 100 yards into the strait.

At Anadolu Hissar an old Genoese castle is seen; also a pretty valley through which runs a small stream named Buyuk Gök Su, or the Sweet Waters of Asia.

The two castles of Anadolu and Rumeli Hissar, now in ruins, the latter on the European side, are situated at the narrowest part of the channel.

From Anadolu Hissar the coast trends nearly due north as far as Kanlija, when it trends eastward. Between the two places mentioned the water is always slack, of which advantage is taken in southerly winds.

**Kanlija Point Light.**—A flashing red light, 82 feet (25.0 m.) above the sea, visible 4 miles, is shown from a white iron column 34 feet (10.4 m.) high located 110 yards from the shore. (See Light List.)

**Chibukli Bay.**—The little bay of Chibukli affords no good anchorage, owing to the great depth of water and being open to the strength of the current.

**Injir and Beikos Bays** (*41° 08′ N., 29° 05′ E.*) offer a large and safe roadstead for a considerable number of vessels, sheltered from the influence of the main current, which in crossing this great bight is diverted into a zone of weak northern eddies within 800 yards of the shore. The village of Yaliköi lies northward of Beikos, and that of Injir to the southward.

The small bay off Sultans Valley lies between Selvi Burnu and the north point of Beikos Bay, on which stands an outpost of the health office. The bay is named after that picturesque valley, which is studded with trees and in which is seen a kiosk.

**Anchorage.**—Vessels generally prefer the bay of Beikos to that of Injir and anchor in 18 to 26 fathoms (32.9 to 47.5 m.) about 400 yards from the shore abreast the villages of Yaliköi and Beikos, whereas the anchorage off Injir is much obstructed by a mud flat extending 600 yards from abreast the old minaret and carrying only 6 to 15 feet (1.8 to 4.6 m.), with some points of rocks and ledges of gravel on its outer edge. Vessels should moor as taut as practicable, and great attention is necessary to keep the hawse clear.

The best anchorage in Beikos Bay was reported to be in 36 fathoms (65.8 m.) off Karaja Burnu. In this position with the prevailing northeasterly wind the vessel will lie head to wind and will be out of the current, and with a southwesterly wind the vessel will be in the main stream of the northeasterly current and lie moderately steady under most conditions.

Anchorage to the northwestward or southeastward of the above positions in a southwesterly wind has been found to be very unsuitable owing to strong eddies. The holding ground is good throughout the bay.

The small bay off Sultans Valley has a depth of 7 to 12 fathoms (12.8 to 21.9 m.), mud mixed with sand, and is fringed by a bank extending 50 to 150 yards from the shore on the outer edge of which are 5 fathoms (9.1 m.).

Vessels sometimes moor in this bay northeastward and southwestward, with 50 fathoms (91.4 m.) on each cable, in 8 to 10 fathoms (14.6 to 18.3 m.), but the most sheltered anchorage is with Selvi Burnu bearing 323°, 900 yards, and the French ambassador's flagstaff at Therapia 281°.

**Piers.**—A small pier with a shallow bank fronting it is situated about 150 yards northward of Hunkiar Iskalessi, the north point of Beikos Bay.

There are numerous landing places in Beikos and Injir Bays, also a ferry steamer pier at Beikos and another at Pasha Bagche; the latter has 2½ fathoms (4.6 m.) alongside.

**Rock.**—At about 150 yards northwestward of the pier situated near Hunkiar Iskalessi is a rock having 1½ fathoms (2.7 m.) over it.

**Water.**—Water can be obtained from Beikos and is brought alongside in water boats.

**Fuel oil station.**—An oil depot is situated on the south shore of the bay at about ½ mile southwestward of Injirköi. There are four piers at the depot, which have from 2½ to 3 fathoms (4.6 to 5.5 m.) alongside.

**Selvi Burnu** is fringed by a bank the outer edge of which has a depth of 5 fathoms (9.1 m.) and is 100 yards from the shore. There is a fuel oil depot on the northern side of the point, off which are two mooring buoys.

Between Injir Bay and Selvi Burnu the channel current is but little felt inshore, but there are generally slight eddies which will assist vessels in working to Selvi Burnu.

**Englishman or Umur Banks,** although lying in the widest part of the channel, are dangerous to the navigation of the Bosporus on account of the current which sweeps across them from Mezar Burnu. Their northern edge, of 3 fathoms (5.5 m.), with 5 fathoms (9.1 m.) close-to, is 600 yards southwestward from the southern extremity of Mujue Burnu, the northern extremity of Umur Bay. The northern edge of 5 fathoms (9.1 m.) lies northwestward 150 yards from this spot. There is also a small patch of 5 fathoms (9.1 m.) situated 350 yards southwest of Mujue Burnu.

From the northern edge of 5 fathoms (9.1 m.) the banks extend 1,800 yards in a southerly direction, with a head near the southern edge having a depth of only 1 foot (0.3 m.), and terminate 500 yards northwestward of Selvi Burnu. Their breadth varies from 200 to 400 yards.

These shoals are separated by a channel running east and west 150 yards in breadth from their edges in 5 fathoms (9.1 m.), and having a depth of 7 fathoms (12.8 m.); but the channel can not be made use of, as the current sweeps across it. They thus form two distinct banks, of which the larger, sometimes named Selvi Bank, is to the southward and occupies two-thirds of the whole length. This bank has a depth of ¼ to 3 fathoms (0.5 m. to 5.5 m.) over a bottom of sand and gravel with stones. The smaller and northern bank has 1½ fathoms (2.7 m.) least water.

The water on Englishman Banks is often discolored.

**Buoys.**—The south and southwest sides of Selvi Bank are marked by red can buoys.

As vessels generally pass westward of Englishman Banks and round to at the south end these buoys are most useful, as formerly vessels frequently grounded on the edge when keeping close to the bank to avoid being swept down the Bosporus.

**Caution.**—The buoys on Selvi Banks are not to be depended upon and are reported missing.

**Light Buoy.**—A white conical buoy surmounted by a globe and showing a flashing red light is moored on the western side of Englishman Banks. It is not to be depended upon.

**Range marks.**—The kiosk open to the southward of Selvi Burnu, bearing 118°, leads southward of Englishman Banks. The low farmhouse on the summit of ridge in line with the right tangent of a conspicuous yellow house to the left of Telli Fort, bearing 16°, leads westward of the banks, and the tree near distant tall house, bearing 9° and just open of Bushy Peak, leads eastward of the banks.

**Umur Bay,** in the mouth of which lie Englishman Banks, is about 1 mile long and about 550 yards wide and has a depth of 5 fathoms (9.1 m.) 50 yards from the shore. This bay, the quarantine ground for vessels arriving from the Black Sea, affords excellent and much-frequented anchorage in the eddy current which there prevails, in 10 to 13 fathoms (18.3 to 23.8 m.) mud, 300 yards from the shore.

**Wrecks.**—The sunken wrecks of two vessels over which there is a least depth of 3 fathoms (5.5 m.) lie close to the shore in Umur Bay at a distance of 1.15 miles 71° from Kirich Burnu flashing green light.

**Majar Kalessi.**—Nearly ½ mile northward of Mujue Burnu stands the large fort of Majar Kalessi.

About ½ mile to the southeastward of Majar Kalessi rises a lofty hill of a round form, named Yusha Dagh, or Giants Mountain, which serves as a mark for vessels from the Black Sea entering the channel in the daytime. Its sides are covered with vegetation and on its summit stands a large white building.

**Majar Bank.**—About 300 yards northeast of Majar Kalessi and extending 200 yards in that direction lies a rocky bank 150 yards long having 5 fathoms (9.1 m.) on its outer edge and only 5 feet (1.5 m.) in the middle.

Vessels closing the coast of Asia in coming from the northward will avoid this bank by keeping the small battery or minaret which lies a little southward of Kirich Point on the European shore open westward of the western extremity of Majar Kalessi.

**Buoy.**—The northeast edge of this bank is marked by a black flat-topped buoy.

**Majar Bay.**—Between Majar Kalessi and Kavak Point a deep bay is formed where the channel current is only slightly felt. The coast about this bay being high causes calms with the winds from the southward and eastward. Vessels rarely anchor in it, there being 17 fathoms (31.1 m.) 200 yards from the shore, and when passing up the channel with a fair wind they give it a wide berth to avoid baffling airs under the high land.

**Kavak Point.**—On this point is situated the fort of Kavak. It faces that of Rumili Kavak in Europe, from which it is distant nearly 1,200 yards. Behind this fort stands the castle of Anatoli Kalessi, an old Genoese building now in a bad state.

**The health office** of Anatoli Kavak is situated a short distance southward of Kavak Point.

**Pilots.**—There is a pilot station at Anatoli Kavak. See paragraph "Pilot and tug service in Turkish waters," page 29.

**Kavak Point Light** (*41° 10′ N., 29° 05′ E.*).—A flashing red light 62 feet (18.9 m.) above the sea, visible 4 miles, is shown from a mast on a white house 26 feet (7.9 m.) high located in the fort. (See Light List.)

**Kechili Bay Anchorage.**—This anchorage offers very poor shelter during northeasterly winds. The water is very deep, and it is therefore well to pay out one shot of chain before dropping anchor, else it may be lost. Six shots of chain is enough, but the other anchor should be dropped when the weather outlook is bad.

**Coast.**—Between Kavak Point and Fil Burnu the coast forms a deep bight, called Kechili Bay, having deep water close to the shore, except at its head, where a flat having 1 to 5 fathoms (1.8 to 9.1 m.) of water extends 200 yards from the shore. A weak eddy sets around this bay to the northward.

**Fil Burnu.**—On this point stands a battery built on a hill extending to the westward.

The coast northward forms a small bay which has a depth of 1 to 5 fathoms (1.8 to 9.1 m.), and along the high land of Fil Burnu there are some rocks with steep edges, but they are close to the shore. From Fil Burnu to Anatoli Lighthouse the shore is studded with rocks, and although there is generally a depth of 5 to 12 fathoms (9.1 to 21.9 m.) 400 yards from the coast, yet the anchorage is bad on account of the currents.

**Poiras Point,** on which stands an old stone castle, faces that of Karibje in Europe.

**Anatoli Light** (*41° 13′ N., 29° 09′ E.*).—An alternating fixed and flashing red and white light, 249 feet (75.9 m.) above the sea, visible 20 miles, is located about 2 miles 124° from Rumeli Light. (See Light List.)

**Fog signal.**—The fog signal is made by a siren at Yum Burnu, ¾ mile northeastward of Anatoli Lighthouse.

**Fishing nets—Caution.**—There is an old-established custom in the Bosporus of permitting fishing vessels to use nets at any place between the Black Sea and the Sea of Marmara. The nets, approximately 200 fathoms long and 2½ fathoms (4.6 m.) deep, are lowered to the bottom in the middle of the channel. A caique displaying in the bow a square red flag on a 6-foot (1.8 m.) pole is placed at each end, using distance lines to the net, which in no way constitute an obstruction to navigation, as a vessel can pass between the two caiques without causing damage, but must avoid the caiques.

**DIRECTIONS from the southward.**—A steam vessel or a sailing vessel with a strong fair wind should keep on the European shore, closing it gradually as Ortaköi Point is approached. By acting thus the vessel will keep in the eddy or countercurrent, the boundary line of which may be clearly perceived between Tophane and Defterdar Point, and will meet in proceeding northward no other difficulties than those arising from the numerous vessels that are always riding at anchor in this part of the Bosporus, taking care not to come within 100 yards of Orta Point, to avoid the small bank which fringes it. At Defterdar Point the countercurrent loses its strength, but the main current is scarcely felt.

After passing Orta Point close the shore, keep in the eddy that reaches to Arnaut Point, taking care to avoid Duimi and Kuri Banks, which are marked by a lighthouse and a white house, respectively. A vessel could pass between these shoals and the village, but it will be prudent at all times to pass outside them unless wishing to make fast to the shore. On clearing these banks again hug the shore till close up to Arnaut Point, when by gradually edging across the current for the opposite coast the vessel will fetch a little southward of Kandilli. In rounding Kandilli give it a berth of at least 100 yards to avoid the fringing shoal, but be ready to give immediate port helm when the current catches the starboard bow.

Between Kandilli and Khanlija the shore must again be neared, recollecting, as Anadolu Hissar is approached, to keep 200 yards from the shore in order to clear the bank which fronts the mouth of the Buyuk Gök Su.

Having advanced as far as Kanlija Point, slant across the current and close the coast of Europe, where the vessel will be greatly favored by the eddy that runs from the Balta Liman to Kiobashi Point, taking care in approaching that point to bring Rumli Hissar in range with Kanlija Point to avoid Yeniköi Bank.

In proceeding northward from Kiobashi Point (*41° 07′ N.*, *29° 04′* E.) sheer across the current and pass into Beikos Bay, where the vessel will profit by the eddy up to Selvi Burnu, when a course may be steered either eastward or westward of Englishman Banks.

Vessels well used to the navigation of the Bosporus frequently pass eastward of the banks when coming from the southward, for besides shortening the distance they can, in case of meeting with a foul wind, easily turn to windward, as the current is always weaker in this bay than in the main channel, and moreover when close in they will be assisted by a weak eddy to the northward. Caution, however, is requisite if Umur Bay is crowded with shipping.

The tree near distant low farmhouse just open of Bushy Peak 9° leads eastward of Englishman Banks and westward of the shoal flat bordering Selvi Burnu.

The low farmhouse on summit ridge in range with the right extremity of a conspicuous yellow house on Telli Point, 16°, leads westward of Englishman Banks.

After passing Englishman Banks the vessel should again close the coast of Europe at Mezar Point and run along that shore to the Black Sea.

With a fresh southwesterly breeze the vessel may follow the Asiatic shore and will find slack water in Majar and Kechili Bays; but this course is not to be recommended, as from their great depth of water they afford no convenient anchorage, besides the liability to calms under Giants Mountain.

A vessel may pass either eastward or westward of Dikili Rock. In the passage between the rock and the shore there is a depth of 9 to 13 fathoms (16.5 to 23.8 m.).

Give a berth of 300 yards to the point which lies ⅓ mile northeast of Rumeli Kavak, on which there is a guardhouse, as it is bordered by a flat and rocky ledge extending 200 yards from the shore.

Give a berth also of 300 yards to the foul ground in the neighborhood of Buyuk Bay.

A sailing vessel with a foul wind should employ a tug, as it is impossible, even with a smart vessel well handled, to proceed at once through the Bosporus into the Black Sea against a foul wind, owing to the strength of the current in different parts of the channel.

There are numerous tugs at Constantinople.

**NORTHERN ENTRANCE of the Bosporus—Aspect.**—On approaching the Bosporus from the Black Sea in clear weather the land about the entrance is easily recognized by the peculiar outlines of the hills on the eastern side of the Bosporus, namely, Alem Dagh (*41° 03′ N., 29° 13′ E.*) and Chatal Dagh (The Brothers), which tower far above the intervening ranges on the Anatolian coast, while the outlines of the Rumelian hills run along for miles at an apparently uniform height. On clear days the mountains of Alem Dagh and Chatal Dagh are visible at a distance of 30 miles and from almost any position in which a vessel may be. See view of the land in the vicinity of the Bosporus on B. A. Chart 2238.

Seven red sand patches also on the coast of Europe between Kilios and Kara Burnu (see pp. 171 and 172) and several large patches of whitewash on the Asiatic side (see pp. 418-420) are likewise good marks, even during fogs, as the latter seldom quite obscure the base of the mountains. On the summit of the high land behind Rumeli Lighthouse on the European shore a conspicuous tree has been seen from a distance of 20 miles from the north-northwestward.

On a nearer approach a forest and an old tower may be observed on a hill in Asia, and the light vessel with two masts (p. 170) will be seen, and when abreast the light vessel the whitewashed mark upon Yum Burnu, appearing in two patches, will serve to point out the position of the lighthouses, which soon after become visible.

The red sand patches about Kilios and to the westward are next seen, as well as the whitewashed marks upon Khairsis Adasi and others to the eastward.

There is a marked difference between the two coasts in this vicinity, as the Anatolian coast from the entrance as far as Marah Burnu being principally fringed with broken cliffs there is little or no beach visible until very close in with the land, while on the Rumelian coast a long sandy beach commences from Kilios and extending to the westward is merely divided by Kara Burnú. From this beach the ground slopes gradually upward, forming into a number of broad spurs covered generally with sand of a reddish tint, so that at a considerable distance great patches are seen extending from the horizon to the top of the hill.

These distinctive features of the shore well define the western side of the entrance to the Bosporus as well as Kara Burnu Lighthouse, about 22 miles to the westward. In the same way the Anatolian coast will be known by the lighthouse on Kilia Burnu and by the absence of the sandy patches.

Notwithstanding the above statements, it has been reported that the absence of well-defined landmarks makes it very difficult to distinguish the northern entrance to the Bosporus, and that owing to mirage Rumeli Lighthouse is difficult to identify at a distance.

**Directions.**—After making out the mouth of the strait steer for its western shore, which is higher than the eastern and is seen from a greater distance. Moreover, the eastern coast should be avoided because the current sets right upon it, and the great depth of water affords no good anchorage in case of bad weather.

During the night great care is requisite not to mistake the lights at the entrance of the channel for the lights of the coast, as although their range is considerable, they are generally badly attended and are seen with difficulty.

Anatoli Lighthouse (*41° 13′ N., 29° 09′ E.*) may be known by day by a wall running down from it. The differences between the two lighthouses will also be a good guide to distinguish the entrance to the channel when within a short distance of it, that in Europe being formed by a double tower, or two towers of different diameters one above the other, while that in Asia is a single tower.

Soundings are likewise a good guide to find the vessel's position on nearing the Bosporus, and recourse should always be had to the lead, especially in foggy weather or at night.

**In thick and foggy weather,** if the light vessel can not be sighted or the fog guns heard when approaching from the northward, endeavor to ascertain the vessel's position by sounding, when a cast of 50 to 55 fathoms (91.4 to 100.6 m.), mud and shell, would be an indication of being off the Anatolian coast; standing cautiously to the southward, if the water shoals rapidly to 45 fathoms (82.3 m.) with the same bottom, a vessel may steer to the westward till sand and shells are obtained, when she would be in the fairway of the entrance.

If, on the other hand, mud alone is found at a depth of 50 to 55 fathoms (91.4 to 100.6 m.) the vessel would be off the Rumelian coast and might stand to the southeast till the water shoaled to about 45 fathoms (82.3 m.), mud and shell; the vessel will then have passed just to the eastward of the entrance and can proceed as before directed. If a cast of 37 to 40 fathoms (67.7 to 73.2 m.), sand and shell, be first obtained a course may be at once steered to the southward for the Bosporus.

A safer course would be after obtaining soundings to steer direct for the light vessel, and when seen a direct course may be shaped for the Bosporus; and if not seen the soundings would sufficiently indicate when the light vessel had been passed, as on approaching from the westward the soundings gradually increase, the bottom when past the light vessel changing from mud to mud and shell if to the southward, and to no bottom with 150 fathoms (274.3 m.) if to the northward. On approaching from the eastward, on the other hand, the soundings gradually decrease, and when past the light vessel the bottom changes from mud and shell to mud alone.

Vessels approaching the Bosporus from the eastward or westward should keep between the 40 and 45 fathoms (73.2 and 82.3 m.) line of soundings till sand and shells are obtained, when they would be just off the entrance; but a prudent navigator in no case would shoal his water to less than 45 fathoms (82.3 m.) until the sight of one of the lighthouses or other marks upon the land afforded additional proof of his position. And it should be borne in mind that the white marks only exist upon the Anatolian coast and the large sandy patches of red on the European side; that the stations of the lifeboat and rocket service to the eastward of the entrance are all painted white with black gable ends, while those to the westward are cream color or cement washed.

Red lights are shown at night from the stations westward of the Bosporus and white lights from those eastward of it.

**False entrances.**—The two localities that bear the strongest resemblance to the entrance of the Bosporus, and which formerly were sometimes taken for it, are Kilia Bay (*41° 10′ N., 29° 36′ E.*) on the eastern side, and the neighborhood of Derkos Lake, situated on the west side of Kara Burnu, on the western side, but with ordinary care, the aid of the lighthouses, rocket houses, and whitewashed marks mistakes should not occur.

If off Kilia in thick or foggy weather a cast of the lead will settle the question, as off here a bank of shells extends to fully 5 miles from the shore, whereas at that distance from the true entrance sand mixed with shells would be obtained with a greater depth of water.

Also off Derkos Lake (*41° 21′* N., *28° 35′* E.) the lead will at once dispel the illusion, as mud and shell or shell alone will be obtained, but no sand and shell.

At the entrance to the Bosporus an inspection of the chart will show the great difference both in the depth of water and nature of the bottom on the bank of soundings off the respective shores. Westward of Kara Burnu, on the Rumelian coast, the 100-fathom (182.9 m.) curve is over 20 miles from the shore and soundings are obtained before the land becomes visible. This distance decreases gradually toward the entrance, where it extends to about 15 miles.

The soundings on this bank gradually decrease toward the shore, the bottom at first being ooze, which changes to mud and broken mussel shells when within an average distance of 7 miles from the shore; when within 3 miles the bottom changes to shells, and at 1 mile from the shore to sand. Off Kara Burnu and to the westward patches of ooze mixed with a soft yellow clay are found in the mud bank, giving a streaky appearance of blue and yellow to what is brought up by the lead.

Off the Anatolian coast the 100-fathom (182.9 m.) bank does not until 20 miles eastward of the Bosporus extend more than 10 miles from the shore; the soundings decrease more rapidly and bottom is mud and small round shells, quite unlike the broken mussel shells of the western coast. The bank of shells also extends much farther from the shore, in some places as far as 5 miles, but changes to sand when within a mile, as on the other side.

Immediately off the entrance of the Bosporus the bottom at first is found to be similar to that off the Rumelian coast, but a bank and shells extends to about 7 miles in a north-northeasterly direction, having to the eastward mud and shells and to the westward mud only, a sufficient indication in itself of the true entrance to the Bosporus, as in no other place in the vicinity will the lead bring up sand and shells in a depth of 36 to 40 fathoms (65.8 to 73.2 m.).

**Rocket, lifeboat, and refuge stations.**—This service, established at the Black Sea entrance to the Bosporus, extends on the European coast from Cape Rumeli to just beyond Mandre, a distance of 28 miles to the westward, and on the Asiatic side from Anatoli to Kilia Point, 21 miles to the eastward.

There are 2 lifeboats and about 19 rocket stations on the European side. The principal stations are cream colored and the intermediate cement washed. There are 2 lifeboats and about 18 rocket stations on the Asiatic side. The rocket houses on this side are painted white, with black gable ends. The greater part of the stations on both sides stand on high ground and form good landmarks.

On the European side the lifeboat stations are at Kilios, about 3 miles west of Cape Rumeli, and at Kara Burnu, 17 miles farther west. The stations where a rocket apparatus is kept are distributed along the coast, being rarely more than 2 miles apart. On the Asiatic side the lifeboat stations are near Riva Fort, 2¾ miles east of Anatoli Lighthouse, and at Kilia Burnu, 19 miles farther east. The rocket stations and houses are situated at intervals along the coast, being about 1 mile apart when near the entrance to the Bosporus, while eastward of Kara Burnu the distance is greater, excepting at Kilia Burnu, where there are several rocket houses within a short distance of one another.

By day and by night the whole coast from Cheshmejik to Kilia is watched by lookout men, and by patrol parties during a gale of wind or in thick snow or foggy weather. Shipmasters in position of danger or difficulty will on all occasions receive gratuitously advice or assistance from the officers and men of the Lifeboat and Rocket Service, who may easily be recognized by their uniform, which bears a distinctive badge on the coat collar.

# CHAPTER V

## BLACK SEA

### WESTERN SHORE, THE BOSPORUS TO ODESSA

**General remarks.**—For a general description of the Black Sea, see page 23. At the end of the preceding chapter is given a description of the lighthouses at the north end of the Bosporus and of the aspect of the coast on either side for some distance, with the directions for approaching the Bosporus from the Black Sea, together with a list of lifeboat and rocket stations on either side; these latter are also mentioned in the following pages at the places where they are situated.

**GENERAL DIRECTIONS—From the northern entrance of the Bosporus to Black Sea ports.**—The Black Sea being almost entirely free from dangers, its navigation is comparatively easy. Good anchorages are scarce, but there are enough to afford shelter in a sea of such small extent, so that a thorough acquaintance with them is of importance. Storms are not uncommon, but they are never of long duration. The sea then, however, is short and troublesome, more especially about the entrance to the Bosporus.

**In a steamer** bound to the Danube a straight course northward may be shaped for the lighthouse at St. George mouth, distant 218 miles from Cape Rumeli. Strangers are advised to shape a course more to the eastward, to make Fidonisi or Serpent Island Light, and thence take a departure for Sulina. Attention must be paid to the lead in thick weather, and it must be remembered that the water becomes muddy as the Danube is approached.

If bound for Odessa, a course should be shaped for Cape Fontan, which is distant 316 miles from the entrance of the Bosporus, passing about 3 miles eastward of the 4¼-fathom (8 m.) bank marked by spar buoys distant 8 miles eastward of the Tsarigradskoe mouth of the Dniester, and from thence steer to pass eastward of the foul ground off Cape Fontan.

**In a sailing vessel,** if after leaving the Bosporus and bound to Odessa northerly winds are met with in the open sea, it would be prudent instead of working along the coast of Rumelia or Bulgaria to close the Krimean shore and take advantage of the northeasterly winds which prevail there independently of the land breezes which Sevastopol, and more particularly Eupatoria, afford almost every night.

Vessels bound from the Bosporus to Theodosia (*45° 02′ N., 35° 24′ E.*) or to Kertch and meeting with easterly winds should in order to avoid the adverse current on the southern coast of the Krimea turn to windward nearer the coast of Anatolia than that of the Krimea as far as Inje Burnu.

If becalmed on the southern coast of the Krimea between Urzuf and Cape Khersonese or on the coast of Circassia toward Pitsunda and Konstantin Points, a vessel will be sensibly affected by the current When endeavoring to turn to windward it is advisable to make long boards out into the open sea and never come in close to the coast, as the mountainous ridges of the Krimea will not favor a vessel off the south coast with any land breezes at night, and those that are found on the Caucasian coast, although fresh in some places, do not reach more than 4 to 5 miles from the shore.

**Bosporus Light Vessel** (*41° 23′ N., 29° 16′ E.*), showing two fixed white lights 28 feet (8.5 m.) above the sea, is moored about 11¾ miles northeast of Rumeli Lighthouse.

**Fog signal.**—The fog signal is a siren, and also a bell. (See Light List.)

**COAST.—Uzunga Burnu,** westward of which there is a rocket house, is the most projecting of the rocky points between Cape Rumeli and Eski Fanaraki Burnu (Kilios). This point forms the eastern side of the largest of several coves, open only to the northward, in which there are depths of 3 fathoms (5.5 m.) at 200 yards from the shore. There is good landing for boats.

This is the most inviting spot in the vicinity in the event of having to run a disabled vessel ashore as a last resource for saving life.

There is a rocket house and a rocket station between this point and Rumeli Lighthouse.

**Wreck.**—A wreck, visible a long distance, is situated about ½ mile westward of Uzunga Burnu.

**Eski Fanaraki Burnu (Kilios Point),** situated about 3½ miles westward of Rumeli Lighthouse, slopes gradually from a hill behind, terminating abruptly in a cliff, leaving a gap a few yards wide between it and a large rock that at one time was evidently a portion of it.

**Rock.**—In a north-northwest direction from Eski Fanaraki Burnu, about 600 to 800 yards distant, is a rock awash and steep-to, named Kalaphotia, after a Greek vessel that was lost there. The sea breaks in bad weather in the passage between it and the point, in which there is a depth of 5 fathoms (9.1 m.). A patch of 2½ fathoms (4.6 m.) lies 100 yards northward of the point.

**Kilios Bay** (*41° 15′ N., 29° 02′ E.*) is an indentation in the coast to the westward of Eski Fanaraki Burnu. The cliffs of that point continue for some little distance to the westward, meeting the sandy beach which stretches eastward from Hissar Kayassi, the western point of the bay. On these cliffs stands Kilios Kalessi, the ancient castle, and barracks for a small garrison. The Turkish village of Kilios is built on the slope behind the castle, so that but little of it is seen from the sea. This locality is well marked by three pillars of an ancient aqueduct, which stand in the little cove to the westward and appear like the tall chimneys of a factory.

**A lifeboat** and rocket station is established at Kilios, from which telegraphic or telephonic messages can be sent to Constantinople.

**Telegraph cables.**—The Odessa and Constantsa telegraph cables are landed in Kilios Bay.

**Anchorage.**—The anchorage abreast Kilios village is in depths of 3 to 4 fathoms (5.5 to 7.3 m.) over a bottom of hard sand at 400 to 600 yards from the shore, sheltered from southerly and easterly winds.

All along this coast with a northerly wind the sea immediately rises, and Kilios Bay is a mass of breakers. At Kilios Point the depth of water has been reported to vary from 3 to 5 feet (0.9 to 1.5 m.), according to the wind. The swell generally sets in before the wind, and vessels at anchor should stand out on the first indication of an approaching norther. There is a remarkable indication in Kilios Bay of the force with which the wind and sea beat in on the shore from the Black Sea, for the whole bight of the bay, about 1 mile in extent, is covered with sand which has evidently been flung up by the waves and carried by the wind over the low hills on the coast, which themselves were probably formed in this manner. These form such a marked contrast of color to the other parts of the coast that they may be seen at a considerable distance, and are the best marks for recognizing the locality.

**Coast—Bank.**—Westward of Kilios a long sandy beach commences, backed by reddish hills, the summits of which are covered with verdure. This beach is broken only at Hissar Kayassi and Kara Burnu, otherwise it is quite straight, extending 303° for 37 miles. It is faced by a sand bank with a depth of 5 feet (1.5 m.) 400 yards from the shore, upon which vessels disabled and desirous to beach are stranded and lost if not carried over by the waves.

**Dumus Dere—Sand patches.**—The red sands of this valley, situated midway between Kilios and Hissar Kayassi, form a good landmark for vessels making the entrance to the Bosporus. There is a rocket house here.

Westward of Dumus Dere and between it and Kara Burnu are six other remarkable patches of red sand, the westernmost being situated 1½ miles westward of Akbunar Valley.

Each of these sand patches extends on both sides of the valley entrances in which they are situated, and from the offing appear double until the bottom of the valley becomes visible.

**Hissar Kayassi,** a rocky point projecting slightly into the sea, has ground rising gradually behind it. On the summit of the point is a battery and a few houses stand on the western slope, hidden from the eastward. West of this point the beach again commences, and continues as far as Kara Burnu. There is a rocket station about ¾ mile westward of Hissar Kayassi, and rocket houses at Yali Tarla, 1½ miles, and at Molos, 3½ miles farther west.

**Reef.**—From Hissar Kayassi a reef about 100 yards in width extends in the direction of Kilios Point 300 yards from the coast, the depth on which is from 6 to 13 feet (1.8 to 4.0 m.). Between the reef and the shore the water deepens.

**Agatchili.**—A rocket station and refuge house is established at Agatchili, and there is a rocket house about 2 miles westward of it. The valley contains many houses and gardens, and a Government farm is situated about 2 miles inland. Molos Valley, in which is situated the center sand patch of the seven patches mentioned above, lies 1 mile eastward of Agatchili.

**Akbunar and Kunduz** have each a rocket house. There is no village, but a refuge house at the latter. Two miles westward of Kunduz is another rocket house.

The sixth of the red patches is at Akbunar and is the largest of them all; the seventh, which is also large, is at the stream 1½ miles westward of Akbunar Cove.

**Wreck.**—A conspicuous wreck is charted close to the shore in the vicinity of Akbunar.

**Yeniköi,** situated on a height about 1½ miles westward from Kunduz, is conspicuous from seaward and has a rocket house.

**Kara Burnu,** situated 21 miles to the northwestward of Cape Rumili, is a broad headland stretching a considerable distance into the sea, forming a small bay on either side. It has a nearly perpendicular face and is steep-to, 20 fathoms (36.6 m.) being obtained about 200 yards from the shore.

The black point on Kara Burnu is very pronounced and may be seen from a considerable distance.

**Lifeboat.**—In the bay to the eastward is the lifeboat house, painted white and resembling a lighthouse. It is located about halfway up the cliff on the black point and is a very prominent mark. On the top of the headland is a rocket station.

**Kara Burnu Light** (*41° 20′ N., 28° 40′ E.*).—A flashing white light, 210 feet (64.0 m.) above the sea, visible 21 miles, is shown from a white tower with a green cupola on the keeper's house, 27 feet (8.2 m.) in height, on the edge of the cliff.

**Village.**—On the summit of the headland and on the eastern slope stands the small village of Kara Burnu, connected with Constantinople by telegraph and by a fair road. There are two ruined batteries situated on the cliffs to the northeast.

**Coast.**—Westward of Kara Burnu a high rocky coast continues as far as Kilij Burnu, where there is a rocket house. Farther west between the brushwood are seen patches of sand, and the western part of this high coast, at Derkos Deresi, consists of a large patch of white sand destitute of all vegetation. This last patch is not visible from seaward, except to a vessel westward of the meridian of Kara Burnu.

**Lake Derkos (False Entrance)** has been given the name of the False Entrance on account of the numerous mistakes occurring under the supposition that it is the true entrance of the Bosporus, an error frequently resulting in shipwreck. It is bounded to the southward by an irregular range of hills, which, bearing some resemblance to the winding self-closing banks of the Bosporus, add greatly to its deceptive appearance in thick weather. Although the coast is lighted, the beacons which distinguished the different localities have been discontinued and care is necessary to guard against any mistake.

The outlet of the lake is frequently closed during the summer months. Two ferries exist for the passage of this outlet, the one belonging to the Lifeboat and Rocket Service being near the shore and the other at the distance of ¾ mile inland.

**Landmarks.**—The following remarks should assist the mariner in distinguishing between False Entrance (Lake Derkos) and the entrance to the Bosporus:

1. False Entrance does not appear as a strait except when seen from the northwestward, while the Bosporus does not open until on a southwesterly bearing.
2. The seven red sand patches previously mentioned, which form one of the principal marks for recognizing the western approach to the Bosporus, are situated east of False Entrance.
3. Should a mountain with two summits situated westward of Kara Burnu be mistaken for Alem Dagh or for Chatal Dagh (The Brothers) it is sufficient to recollect that the two latter are situated eastward of the Bosporus, while the former is to the westward of the False Entrance.

Attention should also be paid to the soundings and the nature of the bottom.

**Orman.**—The country in the immediate vicinity of Lake Derkos shows no sign of cultivation, being covered with brushwood, arbutus, and scrub oak trees. The nearest village, Orman, is several miles inland and has no communication with the sea. It is so named from its situation in a well-wooded country (Orman, meaning woods) and is of some importance, being the chief village of a large district and also a telegraph station.

**Refuge house and rocket stations.**—At Derkos Deresi there is a refuge house, and 1 mile farther westward is a rocket station. Chesmejik, 2½ miles westward of Derkos in a small valley, has a rocket house, and at Mandre, 2 miles to the westward, is the westernmost rocket house on this coast.

**Chesmejik Point,** 3 miles westward of Derkos Deresi, which is steep and rocky and covered with brushwood and stunted trees, marks the commencement of the low hills extending along the shore to the northwestward, which show a yellowish face seaward.

A reef of rocks extends about 300 yards from the shore about 1 mile westward of Chesmejik.

**A patch** of 2 fathoms (3.7 m.) lies about 4¼ miles northwestward of Chesmejik and about ½ mile offshore.

**Chelengos Deresi,** 18 miles nothwestward of Chesmejik Point, is a small cove open to the northeast, where a vessel of light draft might obtain anchorage with offshore winds, bottom sand, and shell.

**Malatra Burnu,** 26 miles northwest of Karu Burnu, is steep, high, and rocky, but is not easy to distinguish from the offing.

**Kastro Deresi,** 5 miles northwest of Chelengos, is afforded some protection from north and northeast winds by a rock situated close to the southward of the northern point of the cove, the anchorage, in 3 fathoms (5.5 m.), being with the southern extremity of this rock bearing east-northeast, bottom sand. This is probably a better anchorage than Chelengos Deresi.

**Serbes (Serveh) Burnu** (*41° 40′ N., 28° 7′ E.*), 4½ miles northwestward of Kastro Deresi and 52 from the Bosporus, projects considerably to the eastward, and would afford shelter from northerly winds if the bottom were not bad and rocky. It is noticeable in appearance from its having rocky streaks of a reddish color on its slopes. A pyramidal rock is situated at the extremity of the cape and a reef extends 300 yards in a southeasterly direction from it.

**Midiah.**—About 2 miles to the southward of Serbes Burnu is a steep cliff between the mouths of two small rivers, above which is built the small town of Midiah, where there is a telegraph station. A little creek about 100 yards in breadth is formed on its southern side, which serves as a shelter against northerly winds to small vessels that can anchor in from 1½ to 2 fathoms (2.7 to 3.7 m.) over a sandy bottom.

**Sandal Point,** 4½ miles northwest of Serbes Burnu, may be recognized by its white cliffs. The coast from Serbes Burnu is clearly identified by the mountains of Agios Pavla and Inada. Agios Pavla consists of two peaks, the northern being the higher. Mount Inada, 1,300 feet (396.2 m.) in height, is situated between a range of mountains inland and the sea.

**Kuri Burnu,** nearly 13 miles to the northward of Serbes Burnu, is of moderate height and projects to the southward. Its shores are sloping, of a yellowish appearance, and a clump of trees on its extremity, as well as the lighthouse, serves to distinguish it.

The depths in the immediate vicinity of the cape are very uneven. It should not be rounded within 400 yards.

**Kuri Burnu Light,** group flashing white, visible 15 miles, is shown from a white masonry tower located near the extremity of the cape. (See Light List.)

**Iniada (Yniada) Road.**—Iniada Burnu, the western angle of the promontory of which Kuri Burnu forms a part, is bordered with rocks, and between it and the village and fort of that name, which lie 2¼ miles to the westward, is Iniada Road. A reef of rocks extends off in a southwesterly direction 400 yards from a ruined tower which stands nearly ¾ mile northwestward of Iniada Point on the northern shore of the road. There is a telegraph station at the village. The fresh water from the streams is indifferent; better water is obtained from springs near the point.

**Wreck.**—The wreck of a gunboat lies in 23 feet (7.0 m.) of water 1 mile 284° from the southern extremity of Iniada Burnu.

**Tersana Burnu.**—This cliff, situated about ⅓ mile southward of Iniada village, is remarkable on account of the whiteness of its rocks. On its northern slope is a large warehouse, and farther to the northward are several buildings and an isolated tree.

**Anchorage.**—A vessel in approaching the road with a northerly wind should keep close round Kuri Burnu and Iniada Burnu, as the wind will fail inside, taking care to avoid the rocks off these points and off the ruined tower. The best anchorage is west-southwestward of the tower, about ¾ mile from the shore, in 6 to 7 fathoms (11.0 to 12.8 m.) over a bottom of sand with fair holding ground, with Iniada Burnu bearing 92°, 1½ miles. There is a depth of from 3 to 4 fathoms (5.5 to 7.3 m.) about 800 yards from the head of the bay. If making a long stay vessels should lift their anchors from time to time; otherwise they become so deeply embedded that it is difficult to weigh them.

Vessels very often visit this roadstead, particularly in autumn and winter, to allow the bad weather to pass; and although it has afforded security to many, yet the sudden changes of wind to which it is subject have been occasionally the cause of shipwrecks. Here, as all along the coast, the winds veer toward the shore every night. A heavy swell sets in at times, which causes vessels to roll very heavily, and then an eddy sets strongly toward Kuri Burnu. At the head of the road there is a beach. The usual landing place for boats is at the quay near Iniada.

**Cape Aya Stefano** lies 4 miles to the northward of Kuri Burnu and projects very little to the eastward.

**Akhtebolu (Agathopoli).**—About 15 miles to the northward of Kuri Burnu is the little town of Akhtebolu. A small cove lies to the southward of the town, formed by two points, on the northernmost of which stands the town, about 52 feet (15.9 m.) above the water, and recognizable from a distance by the windmills in its neighborhood. The point to the southward is about half that height. The entrance to the cove, a little more than 100 yards wide, is between a reef of rocks which borders the northern point and the southern point, which is bold to approach. Most of the rocks are visible and appear as large as buoys above the water, the greatest depth in the channel being about 4¾ fathoms (8.7 m.). Fresh provisions can be obtained at the town. There is a telegraph station. (See Appendix IX, View A.)

**Anchorage.**—On entering the cove a solitary building, which is a church dedicated to Saint Constantine, is seen a little to the southward of the southern point. The anchorage is in about 4 fathoms (7.3 m.), over a sandy bottom, sheltered from all but easterly winds, which can be avoided by approaching nearer the town and securing the vessel's stern to the shore, which is composed of shingle. The greater part of the cove has depths of only about 2 fathoms (3.7 m.).

**Mount Paphia,** 4 miles inland from Akhtebolu, is 1,680 feet (512.1 m.) high and is easily distinguished in clear weather from a distance of 40 miles by its steep and rather pointed formation and the fact that it stands detached from Malaya Paphia, which is near it. See Appendix IX, View A.

**Vasiliko (Basiliko) Harbor** (*42° 10′ N., 27° 54′ E.*).—The little harbor of Vasiliko lies about 5 miles northwestward of Akhtebolu and about 2 miles eastward of a mountain to the northward of Mount Paphia. On the southern point of the harbor stands the village and mills. To the eastward of it, about ⅓ mile from the shore, are several rocks rising a few feet above the water.

**Anchorage.**—The entrance to the harbor is about 600 yards wide and is formed between a reef which extends off the northern point and the point to the southward on which stands the village. A vessel will find 6 fathoms (11.0 m.) at the entrance, and should keep the point of the village aboard and anchor to the westward of it about 100 yards from the shore, in 3 to 4 fathoms (5.5 to 7.3 m.), over a good holding ground of sand, sheltered from nearly all winds. In the other parts of the harbor the holding ground is not good, being composed of sand and flat stones, over which the anchors are liable to drag.

The best place for landing is on the northern side of the bay, where the inhabitants haul up their boats.

Large vessels can anchor outside in depths of 11 to 15 fathoms (20.1 to 27.4 m.) over a bottom of sand.

**Karaagach Anchorage** (*42° 14′ N., 27° 50′ E.*).—The anchorage at Karaagach is in a small cove 5 miles northwest of Vasiliko. The entrance to it is southward of a long and wide reef which extends from the northern point for ⅔ mile in a southeasterly direction, with a depth of 12 to 14 fathoms (21.9 to 25.6 m.) between its extremity and the southern point of the cove. The approach to this roadstead, which is, however, but little frequented, is from the southward, and a vessel should keep the western shore on board before standing for the anchorage, which is in the northern part of the cove in about 4 fathoms (7.3 m.) abreast of a river and well sheltered.

**Cape Karaagach,** the northern point of Karaagach Cove, is easily distinguishable from the other points in its neighborhood, being white and steep and having on its summit a clump of large trees.

**Athanatos Bay.**—About 1½ miles to the northward of Karaagach Cove is a small bay open to the eastward. It is formed by two points bearing nearly north and south from each other, 1½ miles apart, and carries a depth of from 4 to 8 fathoms (7.3 to 14.6 m.) over a sandy bottom. Athanatos, the southern point, has a reef extending from it for more than 300 yards to the northward, with a few of the rocks above water. Zunaritsa, the northern point, has a similar reef running out about the same distance south-southeastward.

**Anchorages.**—The bay should be entered on a 293° true course, with the point on the western shore ahead.

A vessel proceeding to anchor in the southern part of this bay should, on opening out the little bight formed between the cliffs to the westward of Athanatos Point, steer for it when it bears due south. There is room here for five or six vessels in about 4 fathoms (7.3 m.) if they secure their sterns to the shore. A creek about 130 feet wide forms part of this bight, the entrance into which is only large enough to admit a small vessel, but there is space enough inside for three or four vessels drawing 16 feet (4.9 m.) water.

There is anchorage in the northern part of the bay in about 4 fathoms (7.3 m.), with the vessel's stern secured to the shore, between the reef which extends off Zunaritsa Point and the beach which borders the northern shore. The sea sometimes sets in when it is blowing fresh from the southeastward, but the wind does not blow home. Care must be taken in approaching this anchorage to avoid a long flat shelf of sunken rocks which extends off to the southward from the second prominence to the westward of Zunaritsa Point. A vessel, therefore, after passing to the southward of the reef off Zunaritsa Point should continue on to the westward, and only haul up when the end of the beach bears northwest. There is a rivulet in the northwest part of the bay which collects its waters in the plain, but it barely finds a passage to the sea at the foot of the heights.

**Cape Zeitin,** 3 miles northeastward from Zunaritsa Point, which is high and steep, projects considerably to the eastward, and should not be approached within ¼ mile, as it is bordered with rocks. Baghlar Point (Cape Korakas) lies 2 miles to the northward of Cape Zeitin and is safe to approach.

In the bay south of Cape Zeitin the bottom is rocky in places, making it unsuitable for anchorage.

**THE GULF OF BURGAS (Burgas Kalir)** is the only part of the Black Sea which affords several good anchorages. Its two extremities are Baghlar Point to the southward and Cape Emine to the northward, bearing from each other 194° and 14°, distant 22 miles. The town of Burgas lies at the head of the gulf.

The northern side of the gulf, being incommoded by extensive shoal water and by several isolated patches of rock and foul ground, affords no anchorage for a fleet.

**Landmarks.**—At about 5 miles within Cape Zeitin is Mount Bekirli, 1,330 feet (405.3 m.) in height. From the northeastward it appears as a double peak, but from southeastward, seen over the cape, it has a rounded summit. It is the most noticeable of the chain of mountains which encircles the gulf. Farther southeastward is a saddle-shaped mountain. Inland a ridge with five peaks extends a considerable distance; of these the two westernmost are particularly conspicuous. The most westerly is pointed and sharply divided from the adjacent one. All five are clearly seen when approaching the gulf from the northeastward.

Muris Dagh, conical, is situated at the head of the gulf and is an excellent mark; it appears as an island when first seen from the eastward, and is the highest of three mountains adjoining the valley at the head of the gulf.

Mount Foros is the third noticeable mountain. It is, like the second, conical, and lies southeastward of Muris Dagh.

Daghutli group consists of four mountains with pointed summits; the eastern extremity ends near the northern shore of the gulf.

Mount Emine, over the cape of same name, is 1,257 feet (383.1 m) high, fairly round, and covered with trees; it is visible nearly 40 miles in clear weather.

Mount St. Elias, 4½ miles westward of Mount Emine, is 1,286 feet (392.0 m.) in height.

**Kavak Bay.**—About 5 miles north-northwestward of Baghlar Point is Kolokythes, a tongue of land nearly 1 mile in length, forming the northern side of Kavak Bay. In the northwestern angle of this bay several copious springs rise out of a bed of loose sand about 400 yards from the shore. These when united will form a stream at which vessels by sinking casks can obtain a supply of excellent water, clear as crystal and of high repute for its wholesome quality. The spot is well indicated by circular clumps of trees at the sources of the springs.

**Anchorage.**—There is good summer anchorage off this bay for a fleet 1½ miles from the springs, in 18 to 20 fathoms (32.9 to 36.6 m.), on mud. The coast of the bay appears to be bold, except about 400 yards south of the southeast point of the tongue, where there are some rocks above water. Large vessels should anchor with this point bearing to the westward of north.

**Cape Pribachi (Kavo Pithema)** is about 1½ miles northwest of Kolokythes and forms the northwestern extremity of Akroteri and Kalpithes Bays, which lie between these two points. Cape Pribachi, upon which the town of Sozopol is situated, is on the southeastern side of Burgas Gulf and is the extremity of a peninsula projecting ⅔ mile to the northeastward, with a width of ¼ mile. It is joined to the mainland, which is high, by a low and narrow isthmus. Bakirli, an isolated mountain of a round form, serves as a landmark for making the cape, from which it is distant about 6 miles.

**Megalo Nisi, or Kyrios,** a small island about ½ mile in length from east to west, lies about that distance to the northward of Sozopol, forming thus two passages into Sozopol Bay. A vessel in taking the passage between the island and the town, which carries a depth in the middle of about 10 fathoms (18.3 m.), should give the small islet of Agios Petros, which is connected to the eastern end of Megalo Nisi by a reef, a berth of 200 yards, and also take care to avoid the shoal of 1¼ fathoms (2.3 m.) lying about 400 yards southwest of Megalo Nisi. The channel north of Megalo Nisi is much the wider and has a depth of 11 to 13 fathoms (20.1 to 23.8 m.) in the middle.

**Megalo Nisi Light** (*42° 26′ N., 27° 42′ E.*).—A group flashing white light, 143 feet (43.6 m.) above the sea, visible 18 miles, is shown from a white concrete tower located on Megalo Nisi Island.

**Wreck.**—A wreck lies sunk about 1.7 miles 7° from Megalo Nisi Light in 13 fathoms (23.8 m.) of water.

**The port of Sozopol,** on the western side of the peninsula and the town of Sozopol, is sheltered by the small island of Agios Petros, which lies 300 yards westward. The entrance is from the northward and is much narrowed by rocks, which leave near the island a passage of 40 to 46 feet in breadth, which will only admit vessels of light draft. They anchor in 2 to 2½ fathoms (3.7 m. to 4.6 m.) over a sandy bottom and are quite safe. This port has no outlet to the southward, as a bar of sunken rocks runs across it with only 3 to 4 feet (0.9 to 1.2 m.) water over them.

**SOZOPOL** (Sizepoli) has a population of about 4.000 people.

**Supplies.**—Beef, mutton, and fowl can be obtained, also bread of fair quality, at a moderate price. Vegetables are cheap. Water is supplied to the inhabitans of Sozopol from wells.

**Communication.**—There is a telegraph station in the town.

**Trade.**—The principal employment of the people is fishing, vine growing, cattle raising, and gardening.

**Climate.**—The climate is healthy.

**Sozopol Bay,** to the westward of the peninsula, is of a semicircular form, about 2 miles wide and 1¼ miles long.

**Anchorage.**—The best and most sheltered anchorage in Sozopol Bay is in the southeast part, in 6 to 7 fathoms (11 to 12.8 m.), opposite a ravine in the cliff, where there is a coal depot, with the west extremity of Agios Petros Island touching Agios Petros Islet, or in less water farther in if desired.

In the eastern part, about 500 yards west of the isthmus and southward of Agios Petros Island, there is a shoal with 3 feet (0.9 m.) on it.

**Kavos Svitera, or Cape Trias,** is a small peninsula forming the western point of Sozopol Bay. Foul ground extends nearly 350 yards eastward of it.

**Winds.**—In Sozopol Bay in ordinary weather, as elsewhere in the Gulf of Burgas, toward midnight the wind rises from the northwestward, freshens until sunrise, and falls toward noon, veering through northeast to southeast. In the afternoon it freshens from this last direction and falls toward sunset, veering through south and west to northwest.

**Kavos Nikolo,** about 1¼ miles to the northward of Kavos Svitera is bold to approach. A bay is formed between it and Cape Akin, which lies 1¼ miles northwestward, but vessels seldom anchor in it, although it carries a convenient depth from 7 to 9 fathoms (12.8 to 16.5 m.), as it is open to the northeast. A rocky spit runs off nearly 400 yards northeastward from Cape Akin, on which are several rocks above water, with a depth of 8 fathoms (14.6 m.) between them and the cape.

**Monopetra Athia Kavo or Cape Sarleati,** about 2 miles westward of Cape Akin, may be easily distinguished by an isolated round wooded hill that rises ½ mile south of its extremity. It is bordered by a reef above water, and forms, with Cape Akin, a bay of about 1 mile in length, open to the northward. It affords safe shelter from southeasterly winds in 5 to 9 fathoms (9.1 to 16.5 m.) over a bottom of sand. Care must be taken to avoid a 9-foot (2.7 m.) shoal in the western part.

**Sveta Anastatia Island.**—About 1½ miles westward of Monopetra Athia Kavo is Sveta Anastatia or Papas Island. It is small and shallow ground encircles it for a short distance, with some dry rocks close off the south end. A lighthouse, convent, and a mill stand on the island. The landing place is on the southwestern side. (See view on chart.)

**Light** (*42° 28′ N., 27° 33′ E.*).—A fixed white light, 71 feet (21.6 m.) above the sea, visible 11 miles, is shown from a white concrete tower located on Sveta Anastatia Island.

**Sukala Point** lies ¾ mile southwest of Sveta Anastatia Island, between which and Monopetra Athia Kavo is another curved bay, affording good anchorage in 5 to 8 fathoms (9.1 to 14.6 m.) water, sand, and mud. Off Sukala Point a reef extends a short distance, and shoals with from 4 to 5 feet (1.2 to 1.5 m.) of water over them lie in the western part of the bay.

**Chingani Bay.**—To the westward of Sukala Point is the excellent bay of Chingani, or Katsevelo Skala, about 2 miles long and sheltered from all winds. Vessels that seek shelter in the Gulf of Burgas generally anchor in this bay, which is capable of berthing a large number of vessels. The greatest depth is about 8 fathoms (14.6 m.), with 2 to 3 fathoms (3.7 to 5.5 m.) near the shore, over a bottom of mud, good holding ground. Small vessels that load with wine anchor close to the shore near a rivulet at the head of the bay, where there are some sheds and storehouses, which are, however, abandoned in winter. This landing place is named Chingani. A little to the westward there is another rivulet which, carrying a great deal of mud into the bay, has formed a bank with 1½ fathoms (2.7 m.) about 400 yards from the shore.

**Quarantine.**—There is a quarantine station close to the shore in a small cove on the west side of Chingani Bay. It consists of seven houses and a pier. There is a flagstaff in front of the houses.

**Poros Bay.**—Poros Point, the western point of Chingani Bay, is bordered by a rocky shoal which extends about 400 yards to the northward. Close westward of it is situated Poros Bay, about 1 mile long, having 4½ to 5 fathoms (8.1 to 9.1 m.) at its entrance, which is open to the northward. Within the entrance the bay shoals rapidly, and a mud flat which dries extends nearly ½ mile from its head.

As at Chingani, the country vessels that remain here during the bad season lie on the mud near the shore. There is a channel at the southern part of the bay with 3 to 18 feet (0.9 to 5.5 m.) in it, leading to a passage carrying a depth of 2 to 2½ fathoms (3.7 to 4.6 m.), which serves as an outlet to a large lagoon or liman named Akrianu Göl.

**BURGAS BAY** lies between Poros Point and Burgas Point. Between these points the bay recedes 1½ miles, with depths of 5 to 6 fathoms (9.1 to 11 m.) in the center. The western shore of Burgas Bay, which is low, sandy, and covered with reeds, extends to the northward as far as the base of the high land on which the town of Burgas stands. This low shore separates the bay from Burgas Liman, or Muris Göl, which is about 5 miles long from east to west and 2 miles wide. The beach is only 200 yards across at the northern end. (See view on chart.)

The northern part of the bay is comparatively shallow, the 3-fathom (5.5 m.) curve being ½ mile from the shore. A 3-fathom (5.5 m.) spit extends southward to a position 400 yards southwestward of the elbow of the western breakwater.

**Burgas Shoals.**—Burgas Shoals are numerous detached rocky banks to the eastward of the town and harbor, the outermost, with 3¾ fathoms (6.9 m.) least water, lying about 2,200 yards 81° from the eastern breakwater light. Between this shoal and the shore there are several patches of between 2 and 3 fathoms (3.7 to 5.5 m.) water. Daghutli Peak in range with the tumulus, 17°, leads eastward of these shoals.

**Anchorage.**—Vessels of deep draft lie at anchor southeast of the entrance to the port in a depth of 6 to 6½ fathoms (11 to 11.9 m.). Burgas Bay is open to the eastward; winds from that quarter throw in a heavy swell and short sea, and shelter must be sought in the southern bays if it should blow hard from that quarter.

**Buoy.**—A mooring buoy is situated 1,700 yards 188° from the western minaret in the tower.

**Harbor.**—The harbor of Burgas is formed by two breakwaters. The eastern one, starting from the southeast corner of the town, extends in a southeast by south and southerly direction for 1,220 yards. The western one, which commences at Orchard Point, extends in a south-southeasterly direction for 780 yards, then easterly for about 750 yards. A short arm extends from the eastern toward the western breakwater, leaving a passage a little over 200 yards in width. The eastern portion of the inclosed area has been dredged to a depth of 25 feet (7.6 m.). There is a small patch of 22 feet

(6.7 m.) of water 200 yards to the southward of the western breakwater end.

**Lights.**—A fixed white light, 57 feet (17.4 m.) above the sea, visible 10 miles, is shown from a white cylindrical iron tower 28 feet (8.5 m.) high on the head of the eastern breakwater.

A fixed red light, 33 feet (10.1 m.) above the sea, is shown from a white cylindrical iron tower 22 feet (6.7 m.) high located at the entrance to the port on the head of the western breakwater.

A fixed red light, 33 feet (10.1 m.) above the sea, is shown from a white cylindrical iron tower 22 feet (6.7 m.) high located at the entrance to the port on the head of the short arm extending west from the eastern breakwater. (See Light List.)

**A fog signal** is made by a bell located at the southern extremity of the eastern breakwater.

**Pilots** can be obtained in the port. Pilotage is not compulsory.

**BURGAS** contains about 22,300 people. The climate is unhealthful in summer. The surrounding country is very fertile, and in the neighborhood are copper mines which were formerly worked.

**Wharves.**—There are at present only 5 or 6 quay berths for moderate-sized vessels, and very often vessels have to await a berth. There are cranes lifting up to 6 tons.

**Supplies.**—No supplies of coal can be depended on. Fuel oil in small quantities. Fresh provisions at reasonable prices, and water available at the quays.

**Trade.**—Imports, iron, hardware, cotton yarn, and manufactures. Exports, chiefly grain.

**Communication.**—Railway connection with Varna and with Trnovo (Tirnovo) on the main line between Constantinople and Philipolis; also telegraphic communication with all parts. The Turkish steamers and a small Greek steamer ply regularly between Constantinople, Burgas, and Varna, and occasionally to Constantsa. A steamer from London calls regularly.

**Hospital.**—There is a public hospital with 32 beds.

**Shoals.**—The coast between Burgas and Ahillo, 8½ miles to the northeastward, forms a large bight, in and near which are the following shoals:

**Blonde or Burgas Rock,** situated 2¾ miles 70° from Burgas Point, carries a depth of 4¾ fathoms (8.7 m.). Muris Dagh Peak, open southward of Burgas Point 247°, leads close southward of the rock. Some rocky patches, named the Soka Shoals, having from 1¼ to 3 fathoms (2.3 to 5.5 m.) over them, lie about 3½ miles northeastward of Burgas Point, in the northwest part of the gulf. Their outer edge, in 4 fathoms (7.3 m.), is 1 mile from the shore.

**Spitfire Rock,** situated 4½ miles 71° from Burgas Point, has a depth of 3 fathoms (5.5 m.), with 6 fathoms (11 m.) close to its western side. Cape Emine, open to the eastward of Ahillo Point 52°, leads eastward of the rock.

**Lakanathes Rock,** having only 3 fathoms (5.5 m.) over it, is 1 mile 146° from Akroteri Point, on the northern shore of the gulf. Another rocky patch of 2 fathoms (3.7 m.) lies 800 yards south of the same point.

**Stavro Rock** lies about 2½ miles 193° from Ankhelu Point and 3 miles east from Spitfire Rock. Ahillo minaret, on with the high peak on the Balkan range 2°, leads over its shoalest part in 15 feet (4.6 m.). (See view on chart.)

Hill A, open southward of the railway station at Burgas (if it can be seen), bearing 261°, leads southward of Stavro Rock. (See view on chart.)

**Ahillo Bank.**—The middle of a rocky bank named Ahillo lies about 1½ miles 222° from Ahillo Point. It is about 1½ miles in length from north to south and from 400 to 600 yards in breadth, with a depth of 3¼ to 5 fathoms (5.9 to 9.1 m.).

**Crescent Shoal**, of 4½ to 5½ fathoms (8.2 to 10.0 m.), is 1½ miles to the eastward of the Ahillo Bank. A sandy patch of 5 fathoms (9.1 m.) lies ½ mile to the southward of this shoal.

**The peninsula of Ahillo** (*42° 33′ N., 27° 39′ E.*) extends to the southeastward, and on its rocky extremity is the town of the same name. Back of the town are salt pans connected with Ahillo Göl. The mosque in the town is conspicuous. (See view A on chart.)

A shore reef borders the peninsula, and on it are several detached dangers, the most outlying of which are Southeast Ahillo Reef, with less than 1 fathom (1.8 m.), ½ mile southeast of the point, and Northeast Ahillo Reef, 1 mile northward of the point, with 1¾ fathoms (3.2 m.) least depth.

**Anchorage.**—There is safe anchorage with northeasterly winds in the western part of the bight to the westward of the town of Ahillo.

The depths range from 4 to 5 fathoms (7.3 to 9.1 m.), over a bottom of sand, 400 or 600 yards from the shore. A 3-fathom (5.5 m.) spit extends nearly 1 mile to west-southwestward from the eastern shore of the bight. The outer anchorage to the southwestward has from 6 to 7 fathoms (11 to 12.8 m.), over sand and mud.

With easterly or southeasterly winds vessels should run for shelter to either Poros or Chingani Bays.

**Ahillo (Anhialo)**, on the extremity of the peninsula, is a town of about 5,000 people. Water, bread, and fresh provisions can be obtained. Exports principally grain, salt, and wine. Occasional steamer to Varna and Constantinople. Telegraph station.

**Coast—Ravdas (Rhavtha) Burnu.**—From Ahillo Point the coast runs northward for 4½ miles, and then bends round eastward to Ravdas Burnu, forming a bay 1½ miles long.

**Chemose Rocks**, nearly in the middle of the bay and about ¾ mile from the shore, have from 3½ to 5 fathoms (6.4 to 9.1 m.) on them.

**Ravdas Rock,** on which the depth is 3 fathoms (5.5 m.) lies nearly ¾ mile 195° from Ravdas Burnu. The western extremity of the town of Messenvria open of Kavo Kroti 47°, leads 500 yards eastward of the rock. Ravdas Burnu lies about ½ mile to the southward of the village of Ravdas and is bordered by a rocky reef extending ¼ mile from the shore.

**Anchorage.**—There is anchorage off the bay during the summer season in 12 fathoms (21.9 m.) on a muddy bottom, but not nearer the shore than 2 miles for a fleet, owing to the several shoals which contract the inner anchorage.

**Water.**—A summer watering place for a fleet will be found at the Chemose River, which flows into the sea between Messemvria and Ankhelu, near the hamlet of Chemose. It is next in size to the Kamchy, 28 miles to the northward, and is said to run all the summer. Both these rivers are very turbid at this season, but the quality of the water is considered to be not affected by the discoloring sediment.

A vessel can approach the stream on a bearing of 304° and anchor in 6 fathoms (11.0 m.) Launches can approach close to the Chemose and water from it with convenience.

**Kavo Kroti.**—From Rhavtha Burnu the coast trends to the northeastward as far as Messemvria Point, 3¼ miles. Nearly midway between them is a steep, rocky point named Kavo Kroti, westward of which a reef extends for nearly ½ mile from the shore.

**Missevriya (Messemvriya)** (*42° 40′ N., 27° 47′ E.*), like Ahillo and Sozopol, occupies the whole of the peninsula on which it is built and is connected to the mainland by a narrow isthmus of sand, which is sometimes covered by the sea. The rock upon which it is located is nearly surrounded by a reef, which extends from it almost ½ mile to the eastward, and is about the same distance in breadth.

**Anchorage.**—The anchorage, to the southward of the town, is abreast of the isthmus in a small bay in 5 to 8 fathoms (9.1 to 14.6 m.) 800 yards from the shore, over a bottom of sand and shells. There is anchorage also to the northward of the isthmus in about 7 fathoms (12.8 m.), but vessels are here exposed to the squalls which during northerly winds blow violently from Mount Emine.

**The town of Missevriya** contains many ruined Byzantine churches, testifying to its former importance; also one mosque. Population about 1,000. Telegraph station. Small quantities of fresh meat, poultry, and vegetables are available.

**Coast.**—From Missevriya the shore becomes sandy and curves to the northward about 3 miles, when it bends abruptly to the eastward and runs in a straight line for nearly 8 miles to Cape Emine, forming a large bay which affords very good anchorage all over it in from 10 to 12 fathoms (18.3 to 21.9 m.). It is open from east to south and vessels that run in for shelter generally anchor in its western part, which is called Karidies.

On this part of the coast advantage should be taken of the northwest wind which sometimes precedes a north-northeasterly or easterly gale in the winter months to gain an offing, unless an anchorage can be secured, a heavy swell generally giving notice that the wind is about to shift. Should the vessel be between Cape Emine and the Bosporus, she may reach shelter at Iniada Road before thick weather comes on.

**Cape Emine** is a bold-looking headland with a monastery on it dedicated to St. Nicholas. From the southward it appears as an island. A few rocks extend about 400 yards eastward of it and a depth of 5 fathoms (9.1 m.) will be found ½ mile from the shore. (See Appendix IX, view B.)

Mount Emine, a rounded mountain which rises to a height of 1,257 feet (383.2 m.) 1.7 miles within the extremity of the cape, forms a conspicuous landmark.

**Cape Emine Light,** flashing white, 207 feet (63.1 m.) above the sea, visible 20 miles, is shown from a white tower located 6 yards from the extremity of the cape. (See Light List.)

**Anchorages.**—The best anchorage is charted 2½ miles westward of the cape at ½ mile offshore in 9 fathoms (16.5 m.), mud bottom. There are also other anchorages located southwestward and westward of the cape.

**Cockatrise Shoal,** with 5 fathoms (9.1 m.) of water, is situated 3⅓ miles 188° from Cape Emine Lighthouse.

**Coast—Landmarks.**—The coast from Cape Emine extends northward for 27 miles to Galata Burnu, south point of entrance to Varna Bay, and thence 25 miles northeastward to Cape Caliacra. This coast is easily recognized from a distance. Mount Emine and Mount St. George, north side of Varna Bay, 1,000 feet (304.8 m.) high, of the Balkan Range, slope steeply to the sea. Between these the mountains become lower. There are particularly large spaces between the parts of the coast southward of Mount St. George, but on approaching the land a narrow, high ridge shows near Galata Burnu. A mountainous but narrow range stretches northward of Mount St. George, at first fairly straight, and thence undulating. This portion is broken in one place by the valley of Balcic, from which the ridge becomes narrower as it approaches Cape Caliacra.

There is anchorage all along this coast with offshore winds.

**Kotsan Point,** 4½ miles northward of Cape Emine, is steep and wooded on its southern side. Between this point and Cape Emine is a sandy valley through which a river flows.

There is anchorage abreast the valley in 10 fathoms (18.3 m.), or close in in 7 fathoms (12.8 m.), during fine weather.

Four miles northward of Kotsan Point is a sharp point which has a clump of large trees near its extremity.

**Ak Burnu (Cape Aspro)** (*42° 52′ N., 27° 57′ E.*).—The cape is dark in color and its slopes are covered with wood and brushwood. A white point on the cape may be seen from a considerable distance. It is very pronounced and an excellent landmark.

**Aspro.**—The village of Aspro, about 1 mile southward of Cape Aspro, has a roadstead abreast it which is open from north round by the eastward to south. Small vessels anchor here in 4 to 5 fathoms (7.3 to 9.1 m.) to load wood. A wooded hill above the village is conspicuous from seaward. Between this valley and Cape Aspro the shore is white in appearance.

From Cape Aspro the coast inclines a little to the westward of north for 8 miles, up to the mouth of the Kamchik River, and from thence for 2 miles a little eastward of north, to Ilanjik Point.

**Kara Burnu (Black Point)** is about 3 miles northward of Cape Aspro; about ½ mile to the eastward is a rock with less than 6 feet (1.8 m.) of water. A wreck is charted between the point and the rock.

**Caution.**—The coast in this neighborhood should not be approached within a distance of 2 miles.

**Kamchik (Golema Kantsiya) River** (*43° 00′ N., 27° 55′ E.*).—The Kamchik River issues about 10 miles southward of Cape Galata. A broad and wooded plain breaks here through the hills and white cliffs, and the river winds round the northern edge of this plain or valley. It runs throughout the summer, and inside the bar there is a depth of 16 feet (4.9 m.) for more than 1 mile above the entrance.

The river has a bar of 2 to 3 feet (0.6 to 0.9 m.) depth, but launches can anchor at a convenient distance outside and water from the river with long hoses. A low hill terminates within a short distance of the northern bank of the river, with much brushwood upon the top and rear of the ridge.

**Firewood.**—A thick forest grows on the banks of the river and supplies Constantinople with large quantities of firewood. Large stacks of billets are generally lying on the beach for sale, both at this river's mouth and on other parts of the coast.

**Anchorage.**—There is good anchorage off the Kamchik River during the summer in 10 fathoms water, on a bottom of mud, 1¼ miles from the shore. No large vessel should approach nearer to its mouth than 1 mile, as there is a bank of rock and gravel with depths of 2½ and 3 fathoms (4.6 and 5.5 m.) on it and 7 fathoms (12.8 m.) within.

From Ilanjik Point, 2 miles north of Kamchik River, Galata Burnu is about 8 miles north-northeastward, and the depths between them are 5 to 10 fathoms (9.1 to 18.3 m.) about ½ to 1½ miles from the shore.

**Galata Burnu,** the southern point of Varna Bay, is steep and high and is covered with cultivated fields, which give it a bright color in comparison with the somber verdure of the trees which cover the coast to the southward. See Appendix IX, view C.

**Galata Burnu Light** (*43° 10′ N., 27° 59′ E.*), group flashing white, 213 feet (64.9 m.) above the sea, visible 12 miles, is shown from a white concrete tower near the extremity of the cape. (See Light List.)

**Signal station.**—A signal station is located near the lighthouse.

**Wreck—Buoy.**—A sunken wreck marked by a buoy lies 8½ miles eastward of Cape Galata.

**VARNA BAY.**—From Galata Burnu the coast bends abruptly to the westward, forming Varna Bay, the entrance to which lies between Galata Burnu and Cape St. George, bearing from each other northeast and southwest, 4 miles distant. The bay is spacious, with good holding ground, composed of mud and sand, and well sheltered from southerly, westerly, and northerly winds, but open to easterly winds, which it is said seldom blow home. It carries a depth of 10 to 5 fathoms (18.3 to 9.1 m.), the latter depth being found from 400 to 1,000 yards from the shore all round the bay.

**Anchorage.**—The best anchorage in the bay is eastward of Varna Breakwater, in 7 fathoms (12.8 m.) of water.

**Foul ground.**—An area of foul ground lies in the southern part of Varna Bay ¾ mile northwestward from Galata Burnu Lighthouse. It has two pinnacle heads of 3½ and 4¼ fathoms (6.4 and 8.0 m.), upon neither of which will the lead remain, with 5 or 6 fathoms (9.1 or 11.0 m.) around only a few feet distant. The ground is foul for anchoring nearly 400 yards to each side, there being other columnar points of rock rising to within 4¼ fathoms (8.0 m.) of the surface, with possibly less water on them, as the pinnacles are so small that the lead will not remain upon their summits. The bottom in the vicinity appears to be rock, thinly covered with sand.

**Fishing nets** are located northward of Galata Burnu, extending 100 to 150 yards from shore; and between Hamman Alteh and the foul ground northward extending 150 to 200 yards from shore.

**Varna Harbor** (*43° 12′ N., 27° 57′* E.) is formed by two breakwaters. The eastern one, starting from the southeast corner of the town, runs in a southerly direction for 1,350 yards, having a short arm 110 yards long on its western side 500 yards from its end and abreast the southern breakwater. The southern breakwater, starting from the western shore, runs in an easterly direction for 740 yards, leaving an opening 220 yards wide between the two breakwaters. The harbor has been dredged to a depth of 4 fathoms (7.3 m.).

The town adjoins the harbor on the north and is picturesquely situated on a plateau sloping gently toward the sea. High minarets show here and there above small white houses surrounded by verdure. The most conspicuous building is the Bulgarian Cathedral, with six cupolas.

Lake Devna (Ezero Devnensko), about 5½ miles in length in an east and west direction, with a width varying from ½ mile to 1 mile, and with general depths of from 7 to 10 fathoms (12.8 to 18.3 m.), is situated westward of the harbor, from which it is separated by a marshy neck of land about 1 mile in width.

A canal with a depth of 16 feet (5.0 m.) connects the harbor and the lake.

**Lights.**—An occulting white light, 48 feet (14.6 m.) above the sea, visible 9 miles, is located on the east breakwater.

A fixed red light, 33 feet (10.1 m.) above the sea, is located on the head of the arm of the east breakwater, east side of the entrance.

A fixed green light, 33 feet (10.1 m.) above the sea, is located on the head of the south breakwater.

**Winds and weather.**—See meteorological table, Appendix III.

**VARNA**, population 50,800, is the third city of Bulgaria in point of size and is the principal port between Constantsa and the Bosporus. It is the eastern terminus of the Varna-Ruschuk Railway and produces some wine, beer, leather, and cotton goods.

**Wharves.**—A railroad quay which has a depth of 23 feet (7.0 m.) alongside has been built on the western side of the harbor, and extensive quays constructed on the northern shore off which are several large warping buoys. The railroad quay is provided with electric light for the night working of cargoes. It has two cranes capable of lifting about 5 tons each, also a floating crane with an estimated capacity of from 75 to 100 tons.

**Repairs.**—Small machinery repairs can be executed at the state railway repair shops.

**Supplies.**—A small supply of coal is usually available. Fresh provisions are abundant and cheap. Good water can be obtained by water boat or from hydrants on the quays.

**Communication.**—The steamships of the principal lines trading to the Black Sea, Italy, and ports of the eastern Mediterranean call at Varna frequently. There is communication by rail with Ruschuk and with Sofia via Trnovo: also by telegraph with the continental system. There is a cable to Sevastopol.

**Radio.**—There is a radio station at Varna, call letters LZF, wave length 600 meters. This station handles commercial messages.

**Hospital.**—There is a large hospital.

**Coast.**—From the town of Varna the coast trends east by north toward Cape St. Dimitri and Cape St. George, and is covered with country houses and gardens. The water shoals gradually to within 700 yards from the shore, with the exception of some foul grounds which lies about ½ eastward of the town 600 yards from the shore.

**Euxinograd Bay** lies westward of Cape St. Dimitri. A small breakwater shelters the landing place for the royal summer palace, which is situated near Cape St. Dimitri. This palace with its tower forms a conspicuous landmark, and when occupied its lights are visible several miles.

**Cape St. George** (*43° 13′ N., 28° 03′ E.*).—The northeast point of Varna Bay, named Cape St. George, after a monastery behind it, should not be approached nearer than 500 yards, as some foul patches lie fully 300 yards from the cliffy points.

**St. George, or Chingani, Reef** lies 2½ miles northeast from the cape and consists of several rocky patches, extending nearly ½ mile along the coast and the same distance off it, over which there are only 3 and 4 feet (0.9 and 1.2 m.) of water. There is shallow water for ½mile outside the rocks, so that no vessel should approach the coast nearer than 1½ miles, or to a less depth than 10 fathoms (18.3 m.) either abreast or to the northward of the reef. The marks for clearing the reef are the western end and summit of Mount Galata (the highest flat hill south of Varna Bay) a little open east of Cape St. George, bearing 233°.

**A bank** about 3 miles long and the same distance offshore, with a depth of 10 fathoms (18.3 m.) over it, is shown on the chart to the northeastward of Cape St. George.

**Kavarna Bay.**—The vast curve that the coast takes to the northward and eastward between Cape St. George and Cape Caliacra, which bears 68°, distant 22 miles, is named Kavarna Bay, in which are the smaller bays of Batova and Balcic and the roadstead of Kavarna.

**Reef.**—A reef, having a depth in places of from 1 to 2 fathoms (1.8 to 3.7 m.), borders the shore from St. George Reef to Balcic and extends within the 5-fathom (9.1 m.) line, from ½ mile to 1 mile from the coast.

**Batova Bay** lies 9 miles northeastward of Cape St. George and abreast a thickly wooded and very swampy plain, across which west-northwesterly winds blow with great strength. The anchorage is in 7 or 8 fathoms (12.8 or 14.6 m.) about 1¼ miles from the shore.

**Wreck.**—A steamer with the masts and part of the funnel showing lies off the middle of the bay about 2¾ miles from shore. A buoy marks this wreck.

**Balcic Bay—Anchorage** (*43° 23′ N., 28° 11′ E.*).—Balcic Bay, abreast of the village of that name, about 3½ miles northeast of Batova Bay and in the northwest bight of the great bay of Kavarna, serves as a place of refuge for vessels not only in northerly winds during the winter months but from all bad weather. It is open to southeasterly and southerly winds, which the natives say never blow home, and therefore allow their vessels to winter there with great confidence. The anchorage is to the southward of the village, about

¾ mile from the shore in 5 to 6 fathoms (9.1 to 11 m.), muddy bottom. There is good anchorage for a fleet in Balcic Bay sheltered from the prevailing winds, over a bottom of tough clay, gradually shoaling to the coast.

**BALCIC**, on the northern shore of Balcic Bay, is of little commercial importance. Population 5,000.

**Supplies.**—Sheep, fowl, eggs, fruit, and vegetables are obtainable, and any quantity of water from a stream at the head of a ravine ½ mile west of the village.

**Communication.**—Railroad to Dobric and Babadag, and under construction to Tulcea. Telegraph station.

**Kavarna.**—About 9 miles eastward of Balcic and about 6 miles northwestward of Cape Caliacra is a deep ravine divided in the middle by a triangular isolated hillock, which is easy to distinguish from all directions. Near the sea are several storehouses for grain and at the head of the ravine on the heights is the village of Kavarna, which is not visible from the sea. The roadstead of Kavarna also serves for shelter to vessels in bad weather, but it is not as safe as that of Balcic. The anchorage is about 1¼ miles offshore in about 8 fathoms (14.6 m.).

**Cape Caliacra (Kaleakra)**, which rises 80 feet (24.4 m.) above the sea, is the southern extremity of a small peninsula about 800 yards long and 200 wide. Its shores are sloping and of a reddish color, and from a little distance to the eastward it appears quite isolated from the mainland, which is higher. The cape is bordered by a reef, to which a berth of 200 yards must be given in passing. Shelter in northwest winds may be found under the cape.

Cape Caliacra is remarkable for its prominence as well as for its being a point of demarcation between the high and low land. The western coast of the Black Sea for 100 miles to the southward of this cape affords, at the foot of mountains generally very picturesque, a great number of bays, coves, and harbors more or less secure; but to the northward the aspect of the coast changes to a moderate height and level surface, with shores only slightly indented, affording but little shelter all the way to Odessa. Near Caliacra also the bottom of the basin of the Black Sea rises suddenly to the depth of about 50 fathoms (91.4 m.), which depth continues toward Eupatoria and Sevastopol.

**Cape Caliacra Light**, flashing white, 164 feet (50 m.) above the sea, visible 18 miles, is shown from a white tower on keeper's house located 20 yards from the extremity of the cape. (See Light List.)

**Anchorage** can be obtained in 7 fathoms (12.8 m.) about 2 miles westward of the cape.

**Coast.**—From Cape Caliacra the coast is flat topped and rocky, with steep cliffs, mostly red in color, and takes a northeasterly direction for 12½ miles to Cape Shableh. The large village of Kvila is situated about midway, mostly surrounded by tall trees; on both sides of it are other and smaller villages, also surrounded by trees.

**Local magnetic attraction** has been observed between Capes Caliacra and Shableh. In 1926 the master of the American steamer *Storm King* reported finding a magnetic disturbance in this vicinity amounting to 18° west.

**Cape Shableh** (*43° 33′ N., 28° 39′ E.*).—The cape is not conspicuous from a distance. There is a fairly large hillock within it which is seen before the lighthouse. Within the cape is the large village of Shableh, surrounded by trees and only visible from the northeastward. See Appendix IX, view D.

Off the cape a reef extends 300 yards from the shore, on which the sea breaks when there is any swell; and off the hillock a reef extends to a distance of 600 yards.

**Cape Shableh Light,** fixed white, 98 feet (29.9 m.) above high water, visible 15 miles, is shown from a white octagonal stone tower located on the cape.

**Coast.**—From Cape Shableh the coast trends almost due north as far as Cape Midia, and is very monotonous in appearance.

Foul ground extends off in places, notably a rock with a depth of 1½ fathoms (2.7 m.) lying 10½ miles northward of Cape Shableh and nearly a mile offshore, and, as there is no object in approaching this coast, vessels should give it a wide berth.

**Port Mangalia** (*43° 29′ N., 28° 37′*E.), 16 miles to northward of Cape Shableh, may be recognized by the little hills in the vicinity and by two high minarets in the town, of which the northern is the higher; also by the northern mole, which shows conspicuously against the sandy beach.

**Moles.**—A mole with an elbow about midway in it, constructed over a shallow spit, extends about 540 yards from the shore.

A short mole extends from shore at 700 yards southward of the root of the large mole. Small craft can find shelter within the moles. The greatest depth at low water between the moles is 16 feet (4.9 m.).

**The current** runs alongshore from the northward at the rate of about ½ knot in ordinary weather, and extends about 3 miles off; its dark color makes it quite distinct from the sea water outside it.

**Anchorage.**—Vessels generally anchor eastward of the town, about 1 mile from the shore in 8 fathoms (14.6 m.); but smaller vessels not going to the moles may anchor southward of the town in 4½ fathoms (8.2 m.) 1,000 yards from the shore, nearly abreast of a little valley through which a stream flows, forming a lagoon on the beach. The roadstead is open to the eastward.

Two red buoys and a black buoy mark the shoals in the approach to the latter anchorage, but they are unreliable. The red buoys should be left on the starboard hand on entering and the black on the port. The best anchorage is in from 4 to 5 fathoms (7.3 to 9.1 m.) 600 yards southward of the end of the northern mole. Should the buoys not be in position, a good mark for the anchorage is a minaret to the south of the town bearing 290°, and Cape Tuzla just open of the headland north of the town, bearing 18°.

**Mangalia Light,** fixed white, 50 feet (15.2 m.) above the sea, visible 10 miles, is shown from a white iron framework tower located on the quay.

Two fixed red lights, 28 and 34 feet (8.5 and 10.4 m.) above the sea, visible 4 miles, are shown from a small white iron cabin located on the head of the northern mole.

**Mangalia** is of little commercial importance. Sheep, fowl, and vegetables can be obtained. Near the town is a medicinal spring much frequented. Grain is exported.

**Cape Tuzla** (*44° 00′ N., 28° 42′ E.*), 11 miles to the northward of Mangalia, is of moderate height and sloping. A few rocks extend a short distance from the cape.

**Cape Tuzla Light,** group flashing white, 206 feet (62.8 m.) above the sea, visible 20 miles, is shown from a white iron framework with a central column on keeper's dwelling located about 550 yards north of the cape.

An auxiliary fixed red light, visible 6 miles, is shown from the lighthouse at Cape Tuzla. (See Light List.)

**A fog signal** is made by a siren.

**Coast.**—Sand hills extend for about 3 miles to the northward of Cape Tuzla, but at 3½ miles a large depression appears in which is Lake Tuzla, separated from the sea by a low sandy isthmus. This depression and the lighthouse form the best landmarks in this neighborhood. Between Cape Tuzla and Constantsa shoal water extends in places for over 1 mile from the shore, and it should be given a berth of at least 2 miles.

**CONSTANTSA HARBOR** (*44° 10′ N., 28° 41′ E.*), protected by breakwaters and of small extent, lies on the southern side of the peninsula on which is built the town of Constantsa. The extremity of this peninsula, which is low and has on it several conspicuous buildings, is known as Cape Constantsa.

**Aspect.**—Approaching from eastward a tumulus, located about 1 mile northwestward of the cape and having a fort on the summit, is a good landmark, but the first conspicuous objects seen when making the port from the eastward are the oil tanks situated southwestward of the harbor.

A conspicuous white house stands on the cliff about 1¼ miles southwestward of the harbor entrance.

Other conspicuous objects when approaching the port are the grain elevators, then the cathedral, the minaret of the mosque, the disused lighthouse and the casino on the cape, the masts of the vessels, and finally the town itself.

**Shoals** extend off Cape Constantsa for a distance of 600 yards east-northeastward with depths less than 18 feet (5.5 m.). At a distance of ½ mile in the same direction is a detached bank nearly 400 yards in extent which has a least depth of 22 feet (6.7 m.).

Southward of the port, at a distance of ¾ mile from the end of the eastern breakwater, is the 18-foot (5.5 m.) extremity of a rocky spit which extends northeastward from the coast.

**The harbor** is formed by two breakwaters, the southern and the eastern. The southern breakwater begins at the shore near Trajans Wall and extends southeastward 950 yards, then eastward 660 yards. The eastern breakwater extends southward about 1,400 yards from the southern extremity of the town. About 450 yards from the outer end an arm 130 yards long projects toward the southern breakwater, leaving an entrance 175 yards wide. The entrance has a depth of 29 feet (8.8 m.), somewhat decreased by strong northwest winds.

Two moles project from the western side of the harbor, the petroleum basin, with a depth of 29 feet (8.8 m.), being inclosed between the southern mole and the south breakwater, while between the two moles is a second basin, at the head of which two docks are to be built. The northern part of the harbor on its western side is inclosed by the northern mole and on its eastern side by a quay. The general depth in the harbor and alongside the quays is 26 feet (7.9 m.).

The petroleum harbor is difficult of access with a fresh breeze, and it is desirable that vessels entering have sufficient ballast.

There are several mooring buoys in the harbor.

**Lights.**—An occulting white light, 71 feet (21.6 m.) above the sea and visible 14 miles, is shown from a gray stone tower on a square structure 59 feet (18 m.) high located on the extremity of the eastern breakwater.

An occulting green light is located on the arm of the eastern breakwater, and the eastern extremity of the southern breakwater is marked by an occulting red light.

A fixed red light is shown from the quay on the eastern side of the harbor, and on the mole opposite is a fixed green light. (See Light List.)

**Fog signal.**—A siren is sounded from the western side of the harbor entrance (reported irregular).

**Buoy.**—A red whistle buoy is located about 150 yards southward of the extremity of the eastern breakwater; it should be left to starboard entering.

**Wrecks.**—The wreck of a steamer lies sunk in a north-south direction on the eastern side of the entrance to Constantsa Harbor within the eastern breakwater. It is marked by two red and white buoys, one at each end.

A wreck with a least depth over it of 13 feet (4 m.) is charted about 750 yards east-northeastward of the extremity of the eastern breakwater.

**Lifeboat.**—There is a lifeboat and rocket apparatus at Constantsa.

**Winds.**—The prevalent winter wind is the northwest. There are continuous winds from that direction in December and from the northward in January and February. In March southerly winds are experienced, but even then the prevalent wind is from northwest. In April and during the summer months, and to some extent in September and October, land and sea breezes prevail, as the northwest winds predominate in the morning and during the day and evening south and easterly winds prevail. During good settled weather the sea breeze begins about 8 a. m., freshens in the latter part of the afternoon, and falls after about 9 p. m. After that is the land breeze, but it is generally light and only blows strong during thunderstorms on summer nights. In November these breezes cease. Calm weather occurs most frequently in June, July, and August. During a gale a heavy sea is caused in the roadstead, which continues after the storm has passed and causes vessels there to roll heavily.

**Pilots.**—Pilotage is compulsory.

**Directions.**—Vessels arriving off the port in daytime must anchor 1 mile distant from the harbor and await the pilot, who will come off in answer to the pilot flag and take the vessel into the harbor, weather permitting. At night they must anchor 2 miles off the port and await the pilot in the morning.

**CONSTANTSA (KUSTENJEH)** (*44° 10′ N., 28° 41′ E.*) has a population of about 28,000. A large number of the houses are built of stone and several stories in height. The port owes its importance to its protected harbor, its railroad connections with the interior, and to the fact that, unlike the Danube River ports, it is never closed by ice. The port is largely concerned with the shipment of oil and its derivatives; it is also well equipped for shipping grain.

**Wharves.**—There are four loading berths in the petroleum basin and vessels can be loaded at the rate of about 160 tons an hour, the oil being pumped directly from the reservoirs into the vessel's hold. The total storage capacity in the port is about 248,000 tons.

The northern part of the harbor is allotted to the shipment of grain from the elevators on the wharves, onto which the railroad runs. There are three grain elevators in the port, of which only two are fully completed. Each elevator has a capacity of 33,000 tons of grain. Two steamers can load at the same time alongside the grain wharf at the rate of 300 tons per hour.

On the quay in the northeastern side of the harbor there is an electric crane with a lifting capacity of 35 tons.

**Tugs.**—The few harbor tugs are of low power and not always in commission.

**Marine railway.**—See Appendix I. There are several machine shops capable of making some repairs.

**Supplies.**—Fresh vegetables, meats, and fruits in season are plentiful at reasonable prices. Some chandlery and engineers' supplies are obtainable. Water can be obtained from alongside the north quay in the inner harbor, and also from lighters.

**Fuel oil** is available in any quantity.

**Coal.**—Stock of 1,500 tons Cardiff coal maintained. Also some local coal.

**Trade.**—The exports consist of grain, petroleum, and timber. The imports consist of general merchandise.

**Communication.**—A railway to Bucharest via Chernavoda, on the Danube, is the principal means of conveyance for the grain which is grown in the adjoining districts to the steamers for transport to the European markets. Steamers call frequently. Twice-weekly service to Constantinople. Telegraphic communication with all parts. There is a cable to Kilios, at the entrance to the Bosporus. There is a cable to Constantinople.

**Radio.**—There are two radio stations, call letters CVK and CVAZ.

**Hospital.**—There is a hospital at Constantza.

**Pratique.**—The visa of the Rumanian legation at Constantinople is necessary upon the bill of health of all vessels arriving from there.

**Coast.**—Care must be taken in approaching the land to the northward of Cape Constantsa, for between it and Cape Singhol, which lies 2¼ miles to the northward, there are several rocky patches more or less dangerous lying nearly 1½ miles from the coast.

A submerged obstruction is reported to lie about 1½ miles eastward of Cape Singhol in (approximately) 44° 13′ N., 28° 43′ E.

**Cape Midia** (*44° 21′ N., 28° 43½′ E.*) bears 14° about 8½ miles from Cape Singhol and affords but slight shelter from northerly winds. The village of Caraharmon, with a wood and a mill, stand on high ground 6½ miles northward of the cape, and this high land is visible for a long distance. Northward of the village the coast becomes low and sandy, which indicates the approach to the mouths of the Danube.

**RIVER DANUBE—General remarks.**—At its source the Danube is about 3,000 feet (914.4 m.) above the level of the sea. It traverses the southern part of Germany, Austria, Hungary, Yugoslavia, and Rumania, and empties into the Black Sea after a course of about 1,750 miles, draining a territory of about 300,000 square miles. The course lies through an Alpine country to Ulm, where its elevation is 1,500 feet (457.2 m.) above the sea. At Ulm the Iller joins the Danube and it becomes navigable for flat-bottomed boats of 100 tons. The river here is 300 feet broad.

At Donauworth, 40 miles below Ulm, the Danube is 180 yards wide and steam navigation begins, as steamers ply daily from May to September between Donauworth and Ratisbon. Between Neustadt and Ratisbon the river forces its way through a defile (named Lang Wand) nearly 1 mile in length, the sides of which consist of perpendicular cliffs 400 to 600 feet (121.9 to 182.9 m.) high. The summits of these cliffs are in places not more than 150 feet apart and overhang the water. At the eastern end of the defile is Kelheim, at the junction of the Altmuhl with the Danube, and the Altmuhl is joined to the River Main at Bamberg by the Ludwig Canal, 110 miles long and 7 feet (2.1 m.) deep, so that it is possible to traverse the European continent by water from the North Sea to the Black Sea. Ludwig Canal has 100 locks, each with a depth of from 3 to 6 feet (0.9 to 1.8 m.). Kelheim is much exposed to ice bursts and inundations.

From Ratisbon (Regensburg) (*49° 01′ N., 21° 06′ E.*), the most northern point of the Danube, where there is a harbor, to Passau, on the borders of Bavaria, navigation is almost impracticable.

At Passau, a frontier town of Bavaria, the Inn River joins the Danube, which is here 800 feet (243.8 m.) above the sea, 220 yards in width, and 23 feet (7.0 m.) deep. At Passau the steam navigation of the Danube again proceeds, and Austrian steamers ply regularly in summer between the town and Vienna. Below Passau the right bank of the river is Austrian and the left Bavarian as far as Engelhartszell, just above which a reef of rocks produces a rapid.

Below Engelhartszell the valley of the Danube becomes wider, but about halfway between that town and Aschach is contracted by a second defile which causes much commotion in the stream of the river. Between Aschach and Linz is an archipelago, and the channel of the river is so constantly changing that navigation is intricate. Before reaching Linz the Danube passes through a chain of mountains which descend to the river in steep cliffs. At Linz, the river is crossed by a stone and iron-trellised bridge 1,700 feet in length.

From Linz the distance by the river to Vienna is 126 miles and steamers leave daily, descending in 8 or 9 hours but occupying 18 to 20 hours in the ascent. A few miles below Linz is Enns. From here the fall of the river to the frontier of Hungary amounts to 348 feet, or an average of 2½ feet per mile. Below Grein the Danube passes through a granitic chain of hills and forms a rapid named Greiner Schwall. At Mantern, about two-thirds of the way from Linz to Vienna, a wooden bridge crosses the river and is the only bridge between Linz and Vienna.

The minimum depth between Passau and Vienna is 4 feet (1.2 m.) when the river is low, excepting at the Fischameat-Thabea Rapids, where it is 3 feet (0.9 m.).

From Vienna (*48° 13′ N., 16° 21′ E.*) the Danube flows east for 150 miles through a wide expanse of flat country to Waitzen, and then turns south to Budapest, 182 miles below Vienna. Between Vienna and Pressburg the river is split up into numerous narrow channels, but from Pressburg to Budapest, viz, at Grein, it is again shut in by high land, and, being here a wide expanse of water, looks more like a lake than a river. Steamers occupy about 13 hours on the voyage from Vienna to Budapest.

At Budapest the river is spanned by a suspension bridge 1,200 feet in length and 37 feet in width, beneath which the Danube, 54 feet (16.5 m.) deep, attains a velocity of 7 to 8 knots.

From Budapest to Semlin, 305 miles, the Danube runs south and southeast with numerous windings and widens out, occupying a bed disproportioned to the volume of its waters, and the navigation is consequently constantly impeded by shallows and shifting beds of sand and gravel.

At Semlin the Danube is nearly 3 miles wide, and there is a steam ferryboat running across the Save to Belgrade, the capital of Yugoslavia. The river steamers occupy 32 hours on the voyage from Budapest to Semlin.

From Semlin to Old Moldova, 76 miles, and from thence to Old Orsova, 63 miles, the Danube flows nearly due east. At Old Moldova it enters a series of rocky gorges unequaled in Europe for grandeur, and after sweeping through a succession of deep pools and shallow rapids, confined within the passes of Steuka, Izlaz, and Kasau, finally reaches its last and most formidable rapids, called the Iron Gates, 632 miles from Vienna and 570 miles from the Black Sea. The Iron Gates, 6 miles below Orsova, are nearly 1 mile in length, with inclinations of 1 in 507 at high river and 1 in 307 at low river, the extreme variations between high and low river being here 14½ feet at the upper end and 22½ feet at the lower end of the gates. The level of low river at Old Moldova is 201 feet (61.3 m.) above sea level and at the lower part of the Iron Gates 118 feet.

The depth at low river in the rapids between Old Moldova and Orsova is in places 1½ feet (0.5 m.), and when the river falls to 3 feet (0.9 m.) above its lowest level all navigation is suspended there. Steamers drawing 5 feet (1.5 m.) can only navigate the Iron Gates in safety when the river is 8 feet above its lowest level as shown on the Orsova gauge. The average annual interruption to the navigation owing to ice obstruction and the low level of the river is said to be 150 days.

A canal commencing at Orsova on the Yugoslavian shore of the river enables vessels to avoid the rapids of the Iron Gates.

The general width of the Danube between Vienna and the Iron Gates is from 2,000 to 6,000 feet when the river is low and from 7 miles to 30 miles when the river is high, but there are exceptions to this, viz, at Peterwardein, 50 miles above Belgrade, the width is 800 feet, and at Kasau, a pass 5½ miles in length, 600 feet; but in those places the depth is greatly increased, being 40 feet (12.2 m.) at Peterwardein and 80 feet (24.4 m.) at the Kasau Pass when the river is low, and the difference between high and low river at the Kasau Pass is about 23 feet.

The mean velocity of the current from Vienna to the Iron Gates is 2 or 3 knots, but at the narrow defiles it attains a velocity of 8 knots at high floods.

The traffic between Belgrade and Budapest is carried on in barges with a carrying power of 250 tons. The largest steamers are from 220 to 250 feet long, 25 to 27½ feet broad, and 10 feet deep, with a displacement of about 450 tons.

**LOWER DANUBE.**—The lower Danube commences at the lower end of the Iron Gates, 570 miles by river from the Black Sea. The fall of the river gradually decreases as it nears the sea, being 103½ feet between the Iron Gates and Chernavoda, 338 miles, or an inclination of 1 in 19,800; between Chernavoda and Braila the fall is 11 feet in 76 miles, or 1 in 36,500; while from Braila to Sulina the fall is but 3 feet in 92 miles, or 1 in 186,360.

The width of the Danube 8 miles below the Iron Gates (at Turnu-Severin) is 3,000 feet and its maximum depth 18 feet (5.5 m.). From here to Widin (83 miles) its course is tortuous and generally in a southerly direction, but from Widin to Chernavoda its course is in a general east direction for 300 miles, and at Chernavoda the width of the main river is 2,000 feet and its depth when low 28 feet (8.5 m.) and 14½ feet above the sea level, the extreme variation between high and low river being 23 feet (7 m.). When the river rises 18 feet (5.5 m.) above its low level the whole country is inundated, and the swollen waters extend across to the village of Fetesti, 8½ miles.

The Danube at Chernavoda, 171 miles from Sulina, is but 40 miles from Constantza, on the Black Sea. There is a railway between the two places which crosses the Danube at Chernavoda by a bridge 100 feet (30.5 m.) above the water, with spans 460 feet wide, with the exception of the central one, which has a width of 630 feet.

Below Chernavoda the Danube bends to the north for a distance of 90 miles to Galatz (11 miles below Braila); thence it flows in a south-easterly direction to the sea.

The Danube discharges into the Black Sea at the St. George and Sulina mouths and through the numerous outlets of the delta of the Kilia; and if the volume of water flowing out is for the sake of comparison supposed to be constituted of 100 parts, it is estimated that 24 of these issue from St. George, 9 from Sulina, and 67 from the Kilia branches. Tulcha, situated on the right bank proper of the Sulina branch, is distant 39 miles from the entrance, and Ismail, on the left bank of the Kilia branch, is 55 miles from Sulina mouth. From the same entrance Isaccea, Reni, and Galatz are 56, 70, and 81 miles, respectively.

**Navigable depths.**—Between the Iron Gates and Braila (*45° 15′ N., 27° 59′ E.*) the general width of the river when low is about

½ mile. At times when the river is very low the depth at certain spots between those places does not exceed 9 feet (2.7 m.); and over three shoals, Nicopoli, Sistov, and Chernavoda, it is then 7, 6, and 4½ feet (2.1, 1.8, and 1.4 m.), respectively. Owing to the existence of these shoals, which often shift their position, seagoing vessels rarely ascend higher than Braila. At ordinary high river vessels drawing 12 feet (3.7 m.) can navigate the river from the Iron Gates to Braila without difficulty. From thence to the sea a minimum depth of 18½ feet (5.6 m.) is maintained.

The extreme difference between high and low river is 24½ feet at Turnu-Severin, 23 feet at Nicopoli and Chernavoda, and 19½ feet at Braila.

Cuttings have been made across bends in the Sulina branch, thereby straightening the ship channel and reducing the distance in the river by 11 miles. The cuttings are 300 feet wide at the bottom, 340 feet at the water line, and have a minimum depth of about 18½ feet (5.6 m.).

At the bifurcation of the river, about 4 miles to the northwestward of Tulcea, is the Chatal d'Ismail, an artificial embankment or mole stretching out into the river in a northwest direction. This, diverting a portion of the stream from the Kilia into the Tulcea Branch, increases the volume of water and scours out the Sulina Channel. The depths at the entrance and in the river depend altogether on the month of the year and the character of the season, and a standard zero has been established to which soundings over any part of the river may be reduced, showing the actual depths which would exist over all the shoals if the river was at its lowest.

The Danube is normally heavily charged with sediment, and in time of flood this condition becomes aggravated, and in consequence of this the season at which the greatest depth of water may be expected is the time when shoals form with the greatest frequency and rapidity. It may happen that a vessel with the regulation draft of water may suddenly find it necessary, under pain of heavy penalties, to stop and lighten cargo. It must be borne in mind that these occurrences result not from the falling of the water but (so to speak) from the rising of the bed of the river.

The depths change rapidly and the river is constantly being dredged. Masters of vessels should keep themselves informed daily of these changes, and not load beyond a safe draft.

**Dates of high and low river.**—The highest water in the river may be expected from February to July and the lowest from September to December, depending altogether on the state of the weather during the year. The river and Black Sea are about zero at Sulina mouth during the winter months, but the level is sometimes raised 2 feet by winter floods.

During the low-water season the level of the river for several miles from its entrance is raised by easterly and lowered by westerly winds, but when the river is in flood this influence of the wind is not observed, excepting near Sulina, where the Black Sea affects the level.

In the year 1889 spring floods were very high and the water rose 11 feet 7 inches above low-water mark at Tulcea; in 1890 there was no marked flood, the level being only 7 feet 8 inches above low water at Tulcea; and in October of the same year the water was only 4 inches above the lowest known, the available depth 44 miles from Sulina being 16 feet 3 inches (4.9 m.); but during the whole of this period of low water the depth of 20½ feet (6.3 m.) was maintained at Sulina mouth, and a similar depth was preserved during the year 1891.

The statistics of different years are given with a view to show the changes in the river under various circumstances. It will be noticed how little they actually affected the normal depth at Sulina mouth.

**Current.**—The current setting down the river varies in velocity according to the conditions, the maximum observed being 5 knots at the mouth in abnormally heavy floods and the minimum ½ knot during the very low water, the ordinary rate not exceeding 3 knots. During a river flood with a northeasterly gale the water has been banked up to 4 feet 3 inches above zero; with strong westerly winds and a low river the water is reduced to 1 foot 6 inches below zero, thus giving the extreme and mean ranges as 5 feet 9 inches and 2 feet, respectively, at Sulina mouth.

**Ice.**—Navigation of the river is usually impracticable during a portion of each winter on account of ice, the average period of closing over a term of 51 years being 37 days. Ice breakers are not used. See paragraph "Ice," page 56.

**Aspect of the delta.**—The Besh Tepe Range, from 700 to 800 feet (213.4 to 243.8 m.) in height, rises in the middle of the low-lying districts forming the delta, about 28 miles in a straight line from the St. George mouth, and about double that distance by the river. It is conspicuous from seaward, having five peaks, but they are often entirely obscured by mists. Several lower peaks of the range lie westward of the Besh Tepe, in the direction of Tulcea, and beyond to Isakcha, bordering the southern shore of the St. George branch.

The shores of the delta, covered with reeds but with very few trees, are only a little above the surface of the sea. They are marked only by fishermen's huts scattered along them.

**European Commission.**—The maintenance of the channels in the Danube delta and the regulation of the traffic as far as Braila, a distance of 93 miles from the sea, is vested in a European Commission provisionally formed by representatives of the following nations: France, Great Britain, Italy, and Rumania.

This commission has power to levy dues on vessels navigating the river within its jurisdiction.

**International Commission.**—The control of the navigable river above Braila and as far as Ulm is vested in the International Commission of the Danube.

**Gura Portita** (*44° 41′ N., 29° 02′ E.*), the southern mouth of the Danube, is 24 miles northeastward of Cape Midia and leads into Razim Lake, which communicates by a very narrow channel with the Danube at Donavitza. From Gura Portiţa the shore of Dranov Island, which forms part of the delta of the river, trends for 28 miles to the eastward, up to St. George mouth. It is very low and is marked in places by fishermen's huts.

**Anchorage** which affords good shelter from northerly winds may be obtained in about 5½ fathoms (10.0 m.), over mud and shells 2½ miles from the coast.

**Beacons and buoys.**—A tripod beacon with horizontal battens and a black top is situated near the Portiţa huts at the river entrance; and a wooden beacon 50 feet (15.2 m.) in height stands near the beach 8¼ miles farther to the eastward.

Eight buoys in line, about 2¼ miles apart, in a depth of 5 fathoms (9.1 m.), mark the anchorage, a red buoy being at each end with six black buoys between. The two eastern buoys are spherical in shape and have each a spherical top mark. The two red buoys are reported missing.

**Wreck.**—A wreck with two masts showing about 33 feet (10.1 m.) above water lies sunk 5.6 miles eastward of Gura Portiţa.

**Current.**—Along this shore a northerly set of ½ knot has been felt out to a depth of about 7 fathoms (12.8 m.), but farther off there is a southerly set of from ¼ to ½ knot.

**St. George mouth.**—This mouth of the Danube, 1½ miles across from lower Olinka Island to St. George Point, is blocked by extensive sand banks with 3 feet (0.9 m.) water over them and has three islands in the entrance. The principal channel is northward of this bank and close past St. George Point and has depths of from 8 to 12 feet (2.4 to 3.7 m.). The depth increases to 24 and 30 feet (7.3 and 9.1 m.) when inside off the village of St. George or Kedrilles, above which the channel has depths of from 11 to 75 feet (3.4 to 22.9 m.). Another channel, beginning with a flat of 3 to 4 feet (0.9 to 1.2 m.) depth, lies between the Olinka Islands and the western shore.

The St. George branch joins the Sulina branch at the Chatal de St. George, near the 34th milepost from Sulina. A black post carrying a white lantern, from which is exhibited a fixed green light, marks the junction of the two branches. See page 209.

Since the improvements at the Sulina mouth this entrance to the Danube is not used as much as formerly, except by fishing boats. The principal industry carried on at this mouth is the sturgeon fishery and the export of caviar and isinglass. There is a telegraph station in St. George village.

**Light** (*44° 51′ N., 29° 37′ E.*).—A flashing white light, 65 feet (19.8 m.) above the sea, visible 10 miles, is shown from a black wooden tower 64 feet (19.5 m.) high on the south end of Sandy Island, the southernmost of the Olinka Islands.

**Fog signal.**—An explosive fog signal is made. (See Light List.)

**Beacons and buoys.**—The shoal ground extending to the eastward and southeastward from St. George mouth and Sandy Island is marked by beacons and buoys.

The northern beacon, consisting of a mast surmounted by two cages, is placed in about 8 feet (2.4 m.) water 54°, $2\frac{4}{10}$ miles, from Sandy Island Lighthouse.

The southern beacon, consisting of a mast surmounted by a barrel, is placed in about 4 feet (1.2 m.) water 2 miles to the southward of the northern beacon, with Sandy Island Lighthouse bearing 163°, distant 2 miles.

The southern edge of this shoal ground is marked in 5 fathoms (9.1 m.) by the two spherical buoys with spherical top marks mentioned previously.

**Caution.**—Shoal water is reported to extend about 1 mile outside the beacons, or much farther eastward from the bar of St. George mouth than is shown on the charts.

**Fidonisi, or Serpent Island** (*45° 15′ N., 30° 13′ E.*).—This little island, named by the Greeks the Island of Serpents, lies 23 miles, 76°, from Sulina entrance, and is about 750 yards in length from northeast to southwest, 1½ miles in circumference, and about 130 feet (39.6 m.) in height. Its shores are composed of cliffs. There are several landing places, but the two best are those at the northeast and south end of the island. Depths of from 2 to 4 fathoms (3.7 to 7.3 m.) extend about 70 yards from the western and southern shores. On the eastern and northeastern shores these depths extend to nearly 200 yards, and within these limits the bottom is foul. See Appendix IX, view E.

**Fidonisi (Serpent Island) Light,** group flashing white, 180 feet (54.9 m.) above the sea, visible 20 miles, is shown from a white octagonal brick tower 71 feet (21.6 m.) high on the summit of the island.

**A fog signal** is made by explosives. (See Light List.)

**Anchorage** may be found 600 yards southward of the lighthouse in 11 fathoms (20.1 m.), sand and shells, with good shelter from winds between northeast and northwest.

**SULINA MOUTH** (*45° 10′ N., 29° 41′ E.*), the middle entrance to the Danube, has been artifically regulated to pass between two jetties stretching out from the coast at the mouth of the river. It is 17 miles to the northward of the St. George, and is the only entrance made use of for commerce on account of the greater depth maintained. Sulina branch extends 43 miles from the sea to Chatal d'Ismail, and is from 300 to 600 yards wide. Its banks in places are 7 feet (2.1 m.) high and never less than 4 feet (1.2 m.), and it carries a minimum depth of 18½ to 19 feet (5.6 to 5.8 m.)

**Aspect.**—The low-lying sandy shores of this entrance are quite devoid of trees, which fact distinguishes it from the southern entrances. On approaching from the eastward the five peaks of Besh Tepe will be seen if the weather is clear; in thick weather the discolored water serves as an excellent indication of the approach to the estuary. The Sulina water tower, a short distance west of the town, is 137 feet (40.8 m.) high and may be seen about 17 miles in clear weather.

**Depth on bar.**—The jetties have been extended in an easterly direction from the lighthouses marking the old jetty heads. In July, 1925, the least depth in the dredged channel of the approach to the entrance between the new jetty heads was 22 feet (6.7 m.). The depths between the jetties will be least in the winter months before the descent of the river floods, which generally commence in March.

**Depth signals.**—The depth of water (in feet) on the bar is shown in figures from the old lighthouse so as to be visible from the bar by the aid of a telescope.

**Lights.**—A fixed white light, 70 feet (21.3 m.) above water, visible 14 miles, is shown from the old lighthouse, a cylindrical white tower 58 feet (17.7 m.) high with a green dome located in the eastern part of the city of Sulina.

A fixed red light, 45 feet (13.7 m.) above water, visible 8 miles, is shown from a white circular tower with a red dome located on the old head of the north jetty at Sulina mouth.

A flashing red light is shown at the outer end of the north jetty extension.

An occulting green light, 38 feet (11.6 m.) above water, is shown from a white cylindrical tower with a green dome located on the old head of the south jetty at Sulina mouth.

A fixed green light, 10 feet (3.1 m.) above water, is shown from a pile beacon located on the training wall, south side of the channel. (See Light List.)

**Fog signals.**—An explosive fog signal is located near the occulting green light on the south jetty. There is a fog bell near the fixed red light on the north jetty.

**Buoys.**—A light and whistle buoy painted black and showing a flashing white light is moored off the entrance in a depth of 40 feet (12.2 m.) and on the axis of the dredged channel in the approach to the heads of the new jetties.

A small black spherical buoy marks the southeastern side of the shoal off the entrance.

A light and bell buoy painted black and showing a flashing green light marks the southern side of the entrance to the dredged channel in the approach to the heads of the new jetties; a red spar buoy is moored abreast it on the northern side of the channel.

The dredged channel is marked by red and black stakes.

**Range beacons.**—Three beacons on the south side of the entrance, which formerly assisted vessels in making the entrance between the old jetty heads, are still in position.

**Pilotage.**—Pilotage is compulsory, except in the case of vessels of less than 100 tons register or 150 tons when crossing the Sulina Bar in ballast, and sailing vessels ascending the river when the master remains on board. Pilots meet vessels near the light and whistle buoy, 1½ miles seaward of the entrance, in a steam pilot vessel, and are bound to board when weather permits or to signal how they may enter. The pilot vessels fly the flag of the Danube commissioners, and by night carry a red light at the foremast head 8 feet below the prescribed white light in addition to the usual side lights for all vessels under way.

Colors showing the vessel's nationality must be hoisted before entering, and should explosives form any portion of the cargo a declaration to that effect must be made to the pilot and a red flag hoisted at the fore, special anchorage being provided under these circumstances.

Although the employment of pilots is compulsory, should the state of the weather prevent the pilot boarding a blue flag will be hoisted at the lighthouse on the south pier. The captain may then enter the port without a pilot, but on his own responsibility.

Officers in command of vessels incur a serious responsibility by proceeding at a higher rate of speed than that indicated by the pilot or by inducing him to adopt a higher rate of speed than his experience would warrant.

The pilots place at the disposal of the captain their experience and knowledge of the river; but as they can not know the defects and difficulties in maneuvering, stopping, going ahead, etc., of each ship, depending as they do upon its engines and construction, the responsibility for the vessel's movement lies entirely with the captain. The European Commission admits no responsibility for damages incurred by the ship itself, nor for other damages of any kind.

The river pilots who take charge above the port form an entirely distinct service from the sea pilots. Naval vessels and vessels of under 200 tons pay no dues or pilotage. Pilots are strictly forbidden to accept any gratuity.

The steering commands given by the pilots are said to vary, some pilots referring to the direction in which the ship's head is to go and others to the helm.

There are pilot offices at Sulina, Galatz, and Braila.

**Tugs** are available.

**Directions.**—The master of a vessel who has never been at Sulina should take his departure from Fidonisi or Serpent Island and steer 257°, when if the weather is clear he will make right ahead Besh Tepe, a remarkable mountain rising 700 to 800 feet (213.4 to 243.8 m.) above the sea. The Sulina water tower, lighthouses, and the buildings on both banks of the river will rise successively to view, and when the light buoy is sighted it should be steered for, and when near it a vessel should stop or anchor and await the arrival of the pilot.

The water becomes very muddy as the river is approached, a fact worthy of notice in thick and foggy weather.

The set of the current in the offing is south-southeast, with a velocity of ¼ to ½ knot. The surface water to the depth of about 3 feet is influenced by the wind. The inshore current is very variable, both as regards strength and direction.

When approaching Sulina from the southward great attention should be paid to the soundings, and a vessel should not approach the shore within the 10-fathom (18.3 m.) curve.

When the entrance is dangerous a blue flag is hoisted at the old lighthouse by day, and at night the south jetty light is extinguished and an additional light shown under the north jetty light. A blue flag also indicates that a vessel is about to leave the Sulina for the sea, and that no vessel is then to enter the approach channel from seaward.

**Caution.**—As the effect of a river flood is the extension and shoaling of the Sulina Spit, or south bank off the Sulina mouth, and the buoys are liable to be swept away by storms, vessels are cautioned to keep well to the northward on entering or leaving the river, more especially as the current sets south during the prevailing northerly winds.

The entrance channel, which is bounded by very shoal water on both sides, is entirely exposed to heavy seas, making entrance under these circumstances difficult, especially for large vessels. In winter the small spar buoys used to replace the ordinary buoys are difficult to pick up except in fine weather.

Fog and snow banks are peculiar to the vicinity of Sulina.

**PORT OF SULINA.**—The moorings are divided into four sections, which are numbered from seaward. The limits of the sections are marked by posts of various colors on both banks of the river. The first section is reserved for naval vessels and vessels belonging to the European Commission of the Danube. It is also used by steam vessels plying regularly to the Danube. The second section is for tugs, for laden vessels awaiting favorable weather to go to sea, and for sailing lighters. The third section is for vessels bound upriver and for empty barges and lighters. The fourth section is for vessels taking in cargo and is divided into 50 berths, 25 on each side of the river.

Of the two berths allotted to naval vessels, the one on the south side of the river is very inadvisable to have in the winter months, as during the frequent northerly gales there is great difficulty in keeping the vessel off the jetty.

The lower part of the port on the north bank, below all other vessels, is reserved for vessels carrying petroleum.

Vessels carrying explosives must fly a red flag and anchor in the upper part of the port above all other vessels.

Ships must be anchored in the berths pointed out by the port officials, who will give all necessary directions regarding the placing of hawsers.

Anchors must always be ready for letting go, and a kedge for laying out in case of necessity.

A bow and quarter pole must be taken on board. They can be obtained from the works of the European Commission on the north bank of the river. The spike of the quarter pole is put in the bank or lashed to a bollard on the quay, and the other end of the pole against the vessel's quarter to keep her stern off the bank, while the bow is kept off by a bower anchor, the ship being breasted in with springs.

**Lifeboats.**—There are two lifeboats at Sulina. The station is provided with rocket apparatus.

**Quarantine.**—The detached mole on the north side of the entrance to the port is reserved for vessels in quarantine. The health officer boards vessels opposite the British consulate.

**Port regulations.**—The roadstead of Sulina, extending 2 miles seaward, and the port 3 miles up the river from the entrance, are under the authority of the captain of the port. From thence an inspector of navigation has charge of the navigation of the river as far as Braila. Officers in charge of vessels are required to communicate with the captain of the port within 24 hours of their arrival and to obey all orders received from him, the inspector of navigation, or his subordinates, obedience to such orders being, if necessary, enforced by the naval vessels on the station.

All vessels entering the Sulina mouth must have at least 1 foot less draft of water than the depth indicated as existing on the bar at the time. Steamers of more than 1,000 tons gross register are to be provided with an auxiliary rudder unless the captain of the port is satisfied that they are capable of navigating the river without it.

Steamers which come down the river and exceed 130 feet in length are not allowed to turn in any part of Sulina port occupied by other vessels, and steamers more than two abreast may not move in the port when lashed together.

Vessels anchored in the port of Sulina or moored at the quays alongside the banks are forbidden to use either steam whistles or foghorns under any circumstances, and the use of the steam siren is strictly prohibited between the light and bell buoy and the third milepost.

No boats are permitted to move about in the port or from the port to the roadstead at night unless carrying a lighted lantern.

**Ballast.**—Ballast is landed at different places in the port of Sulina and on the river bank, which are selected from time to time by the inspector and captain of the port. It is strictly prohibited to throw it overboard anywhere inside the 10-fathom (18.3 m.) curve either in the port of roadstead.

**Proceeding to sea via Sulina.**—Vessels that have loaded at one of the ports on the lower Danube and do not desire to stop at Sulina may proceed direct to Sulina Roadstead and from there carry out the formalities required by the regulations. The captain of the port of Sulina should be communicated with in advance by telegraph.

**SULINA** (*45° 09′ N., 29° 40′ E.*).—The town, which includes the principal buildings of the European Commission, the marine hospital, pilot and lifeboat stations, is situated on the south bank of the river partly surrounded by swamps, the workshops and the houses of the employees of the European Commission being on the north bank of the river. The population numbers about 5,000.

Sulina is the chief shipping place for the grain of the entire Danube region, the cargoes being brought down the river in large lighters carrying from 1,500 to 3,000 tons. Vessels are loaded from floating steam elevators. It will always be advantageous to load at Sulina rather than at Galatz or Braila, the passage of the river being attended with risks even under the most favorable circumstances.

Sulina is a free port.

**Quays** extend along both sides of the river; total length about 3 miles. Vessels load alongside or by lighter.

**Supplies.**—Meat, vegetables, and bread can be procured, but are not plentiful. Good drinking water can be obtained at the south jetty.

**Coal.**—About 5,000 tons of coal is kept in stock. There is a coal wharf 1,500 feet in length alongside which two steamers can coal at the same time. About 1,200 tons can be loaded in 24 hours.

**Trade.**—The chief export is grain; the other exports consist of petroleum, timber, etc. The imports consist of cotton and woolen goods, machinery, and general merchandise.

**Communication.**—Steamers call regularly. There is telegraphic communication with Galatz.

**Hospital.**—Seamen are treated gratuitously at the marine hospital.

**ABOVE SULINA—Buoys and beacons.**—In difficult parts of the river the channel is marked by red conical and black can buoys. During winter they are replaced by spar buoys.

Red buoys indicate that the channel lies between them and the right bank, and they must therefore be left on the starboard hand by vessels proceeding upriver; and black buoys that the channel lies between them and the left bank. The channels are also marked by leading beacons consisting of posts with diamond-shaped top mark, painted black with a white vertical line, erected on the banks of the river.

The posts marked with inverted anchors indicate places where vessels are forbidden to anchor.

Mileposts on the left bank indicate the distance from Sulina in nautical miles.

**Lights.**—The first 8½ miles of the Sulina branch is lighted by red lights on the northern bank and white lights on the southern bank. There are nine lights altogether, five white and four red.

A black post (*45° 11′ N., 28° 55′ E.*) surmounted by a white lantern, about 20 feet (6.1 m.) in height, from which a fixed green light is exhibited, marks the junction of the Sulina and St. George branches. See page 202.

An iron framework lighthouse about 20 feet (6.1 m.) in height, painted white, from which a fixed green light is exhibited, is situated on the extremity of a line of rocks jutting out from the south shore of the river about ½ mile below tulcha.

A white post surmounted by a white lantern, about 20 feet (6.1 m.) in height, from which a fixed red light is exhibited, is situated at Chatal d'Ismail and marks the junction of the Tulcea and Kilia branches.

**Signals.**—A blue flag hoisted by day on the flagstaffs of the inspectorates of Chamourli, Gorgova, Chatel de St. George, and Tulcea indicates the closing of the Sulina branch.

At night three lights are placed in a vertical line on these masts, the upper and lower being red and the middle one white.

**The rules of the road** and regulations regarding lights are the same as those in general use at present, with the following additions: Vessels proceeding in the same direction should not as a rule endeavor to pass one another, and those passing in opposite directions should only do so in places where the breadth is sufficient. Ships going up the river should wait below all narrow places and bends to allow descending ships to pass; the use of the steam whistle indicating direction of helm or reversal of engines is advisable, and the whistle signal of the descending vessel is the ruling one.

When one steamer wishes to pass another going in the same direction any of the following signals may be used:

(*a*) Five strokes on the bell.
(*b*) Five whistles.
(*c*) Waving a flag on the forecastle.
(*d*) Hoisting a blue flag half-mast by day.
(*e*) Hoisting a white light half-mast by night.

A steamer wishing to pass a sailing vessel should make one of the signals prescribed above and pass to leeward of her. Speed should be slackened when passing grain-laden lighters or dredgers, and in all cases where the wash is likely to be injurious; also when approaching bends, until it is assured that the river is clear ahead; and steamers should never attempt to pass unnecessarily close to any vessel, especially one dropping down with the stream.

A sailing ship overtaking another should hail the overtaken vessel and pass to windward of her.

Sailing vessels tacking must avoid getting in the way of steamers. Sailing vessels with the wind free must keep out of the way of vessels close-hauled or vessels drifting. Tugboats and light steamers proceeding up the river navigate at night.

Vessels anchored or moored in the river for the night are required to have a lantern placed on the yardarm or other conspicuous part on the side toward the channel, which can be seen both up and down the river. If more than 150 feet long they must in addition show a white light at or near the stern of the vessel. Rafts navigating at night should show a white light at each angle and three white lights placed vertically at the masthead. When secured to the bank the lights will only be exhibited from the angles toward the channel.

The ordinary fog signals must be used in thick weather by vessels under way, also sound signals by steam whistle to indicate the course to other vessels under way; but the use of the steam siren is strictly prohibited at Sulina between the light and bell buoy and the third milepost.

**Speed limits.**—Vessels of more than 800 tons register must not exceed a speed of 8 knots through the water when navigating the Sulina branch of the Danube. When, however, the river is high permission may be obtained from the inspector of navigation for vessels bound down the river to proceed at 9 knots.

Vessels under 800 tons which the commissioners consider might, if they exceeded 8 knots, cause damage to the river banks, may also receive instructions to proceed at this modified speed.

When the river is low it is recommended that all vessels should reduce speed to 5 knots, especially in the upper portion of the Sulina branch and in the cuttings.

Steam vessels must reduce speed as far as possible when passing through the ports of Sulina, Tulcea, Reni, Galatz, and Braila.

**Tracking.**—There is a towing path on the south bank of the Sulina branch having a least breadth of 20 feet, which is for use in tracking vessels by employing draft animals or landing a portion of the crew. The path may also be used for foot passengers and carriages. As mooring posts have been put up along this branch, driving in stakes or fixing anchors for the purposes of tracking is contrary to regulation.

**Tugs** can be obtained.

**Anchoring and mooring.**—Anchors must always be ready for letting go, and a kedge for laying out in case of necessity.

Posts are provided on both banks of the river to which vessels may secure; but if hawsers are laid out across the stream they must be promptly slacked should another vessel require to pass, and on no account are they to be left across the stream during night or in foggy weather.

Anchoring or mooring alongside the banks is forbidden in the bends of the river, in any portion situated between the posts having an anchor reversed painted on them, or in the navigable channel. Vessels must never be moored more than three abreast alongside either bank, and while at anchor the yards must be braced fore and aft.

In the event of grounding in the river a lookout man must be sent to some suitable place, at least ½ mile above the spot where the ship has taken the ground, to warn all vessels coming downstream and acquaint them with the position of the ship. With as little delay as possible the circumstance should be reported to the inspector; and if necessary to obtain tugs and lighters, tenders for refloating should be telegraphed for.

Posts surmounted by red rectangular crosses indicate places where large vessels descending with the current can most easily, in case of need, swing to their anchor.

**Caution.**—As a general rule, when the banks of the river appear steep there is deep water; where trees and reeds grow to the water's edge it is shallow.

**Depth signals.**—The depths on the shoals in the Sulina branch are posted in a conspicuous place on the south bank of the river at

Sulina, also near the twenty-first milepost, and are shown in English feet. At Tulcha they are posted on one of the commission storehouses above the port.

When sudden changes occur in the least depths of water in the Sulina branch the amount is indicated by black balls hoisted on the flagstaffs of the inspectorates at Chamourli, Gorgova, Chatal de St. George, and Tulcea, each ball shown representing a decrease in depth of 3 inches.

**Dredging operations.**—A space of about ½ mile above and below dredgers lying in any part of the river is marked at the extremities by stakes surmounted by blue flags, and when in this space passing vessels should proceed at reduced speed. When the stakes are surmounted by two barrels the space included is closed to navigation between the hours of 6 p. m. and 6 a. m.

**Tulcea bend—Caution.**—When proceeding upriver and rounding Tulcea bend an anchor should be ready for letting go, as in endeavoring to avoid the rock (marked by a light beacon) off the right bank vessels hug the other shore where the water is slack, but at the bend when they wish to turn up the full force of the current catches the bow, swinging it off to port. This is said to be the cause of the numerous strandings at this point.

**Signal.**—A blue flag hoisted on the flagstaff of the inspectorate at Tulcea denotes that the current at the Tulcea bend is very strong, and it is advisable to round the bend with great care.

**Anchoring and mooring at Tulcea.**—Vessels are not permitted to anchor in the navigable channel nor between posts bearing reversed anchors, and they must moor on the south bank of the river above Tulcea, and never more than three abreast. The buoys are not to be used for mooring, except by regular steamers stopping for a short period. Ships may, however, use them for warping round the Tulcea bend, but only one vessel at a time is allowed to haul on the same buoy.

**River level.**—The zero level of the river at Tulcea is only 1.01 feet above the Black Sea level, but during a heavy flood the river has been known to rise 14 feet 5 inches above the Black Sea, the mean range being 9 feet.

**Tulcea** (*45° 10′ N., 28° 49′ E.*), situated on high ground on the south bank of the Danube 51 miles above Sulina, has a population of about 20,000 people of various nationalities. A prefect and the inspector of the European Commission reside here. There is a telegraph station. A civil and a military hospital are in Tulcea.

**Ismail**, situated on the left bank of the Kilia branch, about 11 miles below Chatal d'Ismail, is a town of about 85,000 population and possesses a hospital with 30 beds. Vessels are moored closed to shore enabling them to maintain communication by staging. There are four berths for seagoing vessels. The principal trade is in grain and timber.

**Chilia (Kilia)** (*45° 27′ N., 29° 16′ E.*), on the left bank of the Kilia branch, about 26 miles below Ismail, is a town of about 12,000 inhabitants. There are three regular loading berths at which vessels can load to 15 feet.

**Isaccea** (*45° 16′ N., 28° 28′ E.*), on the south bank and 56 miles above Sulina, is a small town exporting tobacco. There is a telegraph station.

A pontoon landing pier, at which the river steamers berth, is situated about 1 mile below Isaccea, with which it is connected by a good road.

**The anchorage at Reni,** 69 miles above Sulina and 2 miles below the mouth of the Prut, is a quiet one; the velocity of the stream is from 1¾ to 3 knots. The river within the boundaries of the port of Reni for a distance of 40 yards from its bank has regular depths of 40 to 50 feet (12.2 to 15.2 m.), and there are only two mooring places off the town quays where, during the period of low river (July and August), the depths are insufficient for vessels of moderate draft. The fluctuation of the river level varies from 15 to 20 feet.

**Caution.**—All vessels must pass Reni slowly. A blue flag hoisted at the yardarm of a flagstaff on the quay is a signal for vessels to pass Reni as slowly as possible.

**Reni,** situated on the north bank, is connected by railway with Odessa via Kishinev and Bender; also with Galatz. The population numbers about 8.000.

The river water is used by the inhabitants for drinking. There is a telegraph station and regular communication by steamer.

**Prut River.**—The Prut River, which falls into the Danube about 2 miles above the Reni, has a total length of about 500 miles and is navigable for lighters for about 199 miles. During the dry season the depth of water in places is not more than 2 feet (0.6 m.), but in the spring the river rises from 10 to 12 feet.

**GALATZ** (*45° 25′ N., 28° 05′ E.*), situated on the left bank of the Danube 80 miles above Sulina, is one of the principal ports of Rumania. It is well laid out and attractive. Population about 75,000. There is an efficent electric street railway.

The headquarters of the European Commission of the Danube are at Galatz.

**Mooring.**—Vessels arriving at Galatz must anchor on the left bank and immediately fasten up at the quay or the shore, so as not to interfere with the passage of vessels. If there is no berth on the Galatz side they must go to the other and clear of the river traffic. At night vessels must show a light at each end.

Part of the quay is reserved for naval vessels and part for merchant vessels; it is necessary to let go the port anchor before making fast alongside.

Zeglina harbor for naval vessels lies a little above Galatz.

**Quays.**—There is a quay frontage on the Danube River at Galatz of about 1¼ miles. In addition to this there is a basin which will accomodate seven large vessels loading at one time. The handling of heavy and valuable cargoes is performed at 14 steel pontoon wharves and in the basin. The remainder of the frontage is used for light-draft vessels, log rafts, lumber rafts, etc. The entire water front and basin is served by railroad line.

The basin or wet dock is situated near the lower end of the town. Its dimensions are: Length, 1,640 feet; width, 395 feet; breadth at entrance, 131 feet; depth in the basin, 16½ feet (5.0 m.) at zero; depth at entrance, 19½ feet (5.9 m.). There is a stationary crane capable of lifting 9 tons, one of 2½ tons capacity, and several smaller ones. A grain elevator which will store 25,000 tons is at Galatz.

**Dry docks.**—See Appendix I.

**Tugs.**—There are about nine tugs at the port.

**Repairs.**—Small repairs to hulls and machinery can be made at the shops of the Imperial State Railways.

**Supplies.**—Fresh meat, vegetables, and bread can be obtained; also water of excellent quality from hydrants on the quay.

A small supply of English coal is available by lighters. Coaling can be carried out from bullock carts or lighters alongside the quay, where there is a depth of 30 feet (9.1 m.), or in the basin.

**Trade.**—The principal imports are general merchandise, especially textile fabrics. Galatz is the center of the wood export trade, being situated just below the junction of the Seret River, down which most of the timber from the Carpathians is floated. It is also well situated for the receipt of timber by rail from North Moldavia and the Bukowina. Grain in considerable quantities is also exported.

**Communication.**—There is railway communication with Bucharest and with the continental system; also telegraphic communication with all parts.

Steamers run between Galatz, Reni, Tulcea, and Ismail, stopping off at Isaccea if there are passengers or goods. There is also a good service of steamers which run twice daily to Braila.

**Climate.**—During the summer there is a great deal of marsh fever at Galatz, as in all parts of the lower Danube. Newcomers are especially libale to it.

**Hospital.**—The Elizabeth Doamna will admit seamen

**BRAILA** (*45° 15′ N., 27° 59′ E.*), the principal port of exportation of grain from Rumania, is situated on the left bank of the Danube 91 miles from Sulina, immediately above the junction with the Macin branch. It is the limit of navigation for seagoing vessels. The city is well laid out and has an electric street railway. Population about 70,000.

**Mooring.**—The port is composed of two distinct parts, the basin or wet dock (free port), and the open river port extending southward of it. Vessels loading grain from lighters are often anchored in the middle of the river or off the right bank, operating the transshipment by means of floating grain elevators. The portion mostly used for loading grain is the "grain platform," on the left bank.

**Quays.**—The entire river front facing the city (3 miles frontage) is used for loading or discharging. The frontage is subdivided approximately as follows: 1,334 yards for the basin or wet dock, 1,531 yards outside the city limits, and 1 mile faced with masonry for mooring large vessels.

The "grain platform," extending from the basin gates southward to the landing place of the Rumanian State River Navigation Service, is faced with masonry and well paved, and is served with railroad lines for a depth of about 437 yards. This portion is equipped with eight landing pontoons connected to the shore by metallic girder bridges, at each of which two vessels can be secured abreast. The minimum depth in autumn alongside the pontoons is 23 to 30 feet (7 to 9.1 m.).

The "lighter platform," extending southward of the "grain platform," consists of a well-paved platform and oblique riverside quays similar to those of the river lighters, boomed off the quay and accessible by means of their own wooden landing bridges.

The remainder of the river bank is in a natural state and is used for discharging and loading of cargoes from light-draft river craft.

The basin or west dock, which with the inclosed surrounding ground is the free port, is entered close to the ninety-first milepost. Its dimensions are the same as those of the basin at Galatz, previously given, but it has a depth of 20 to 23 feet (6.1 to 7 m.). The lifting equipment of the port is as follows: A hand crane capable of lifting about 7 tons, 2 electric cranes of 2½ tons capacity, and 2 electric cranes of 3 tons capacity; also a 5-ton electric crane with grabs, for discharging coal. There is 1 elevator on shore and 36 floating elevators with loading capacities of from 40 to 160 tons per hour.

**Repairs.**—Practically no repairs can be made at Braila.

**Supplies.**—Provisions of good quality can be obtained, though advance notice is required for any large amount. Water of indifferent quality is supplied from hydrants on the grain-loading quay. Water is not supplied to vessels at anchor.

From 10,000 to 12,000 tons of Welsh and other coal is generally in stock, and can be taken in at the rate of from 300 to 350 tons per day, but vessels usually take only enough coal at Braila to enable them to reach Constantinople. Fuel oil is kept in stock and there are two oiling berths. The pumps will deliver about 60 to 70 tons per hour.

**Trade.**—The exports are chiefly grain; the imports consist of coal, agricultural machinery, and textile fabrics.

Braila is an important loading port with a granite quay for the large lighters which are towed to Sulina.

**Communication.**—The railway connects Braila with Galatz and Bucharest. There are steamship services with the upper and lower Danube, and ports of the Black and Mediterranean Seas.

**Hospital.**—The municipal hospital will admit seamen.

**Weather.**—See meteorological table, Appendix III.

**Above Braila** a depth of 18 feet (5.5 m.) can be carried as far as Oltenitza, except during the months of October and November.

Vessels drawing not more than 11 feet (3.4 m.) can reach Giurgevo, opposite Rustchuk. Vessels drawing 17 feet (5.2 m.) can reach a point 3½ miles below that town.

A pilot for this part of the river can be obtained at Galatz.

**DELTA OF THE KILIA (Chilia).**—The mouths of the Kilia branch of the Danube cover a distance of about 18 miles, from the Sulina mouth to Prorvin Island, southeast extremity of Zhebriyani Bay. The largest mouths are the Staroe Stambul, Novo Stambul, Pascani, Otnojni, the Ochokov, and the Byelgorod; the Polunochnoe or Midnight branch lies between the two latter. Besides these there are several others of small importance, with snags in them in places.

The whole of the delta is fronted by a shallow flat which extends off the several mouths to a distance of 1 to 2 miles in places, barring them and rendering them useless for other than the fishing craft, which carry on extensively the fishing industry.

**Caution.**—In thick weather it is advisable not to stand into less than 10 fathoms (18.3 m.) between the Sulina mouth and the various outlets of the Kilia branch.

**Navigable depths.**—In the extreme north of the delta the Polunochnoe or Midnight branch has been deepened to a depth of about 12 feet (3.7 m.) and connects the Ochakov mouth with the sea by a channel about 1¾ miles long. Depths of from 12 to 40 feet (3.7 to 12.2 m.) can be carried up the Kilia branch to its junction with the Sulina branch, but its entrances, with the exception of the Midnight branch, are blocked by sand banks having only from 1 to 6 feet (0.3 to 1.8 m.) of water on them.

**Buoys.**—Several red buoys are moored along the edge of the shallow banks in from 4 to 5 fathoms (7.3 to 9.1 m.), as charted. The southern one, off the mouth of the Staroe Stambul, is a large conical buoy; the others are wooden poles laid down by the administration of the Black Sea and Danube fisheries. Vessels should keep well seaward of them, as in many places the land is barely visible. There are clumps of trees amongst the islands and swamps westward of the Staroe Stambul mouth, and to the north of Cape Marus (not charted) there are fir woods.

**Prorvin Beacon** has been established on the island of that name near the northeast extremity of Kilia Delta as a landmark. It consists of a black mast with supports, surmounted by a ball 32 feet (9.7 m.) above the level of the sea.

The depths are under 5 fathoms (9.1 m.) at 2 miles northeastward of the beacon, and the bank is charted as extending still farther northward.

**Zhebriyani Bay,** into which the Midnight branch discharges, is situated on the north side of the Kilia Delta and affords anchorage in from 4 to 7½ fathoms (7.3 to 13.7 m.).

When hauling into Zhebriyani Bay for the Midnight branch of the Danube Zhebriyani Church, a conspicuous object on the mainland, should be kept bearing westward of 284° and well open northward of the black mast 55 feet (16.8 m.) high, surmounted by a lattice square, on the shore fronting the church.

**Volchek Light** (*45° 32′ N., 29° 39′ E.*), fixed white, 84 feet (25.6 m.) above the sea, visible 15 miles, is shown from a mast on a brick foundation 59 feet (18.0 m.) high located on the northwestern shore of Zhebriyani Bay. (Extinguished 1921.)

**POLUNOCHNOE (Midnight) BRANCH** is about 2 miles long in a northerly direction from Ochakov branch to the sea. The entrance is between two narrow spits that have been contracted by dykes.

The dredged channel into this branch extends about ½ mile northward from the entrance and is 154 feet wide, with a depth of 12 feet (3.7 m.). The depth in the channel is subject to change.

**A light and bell buoy,** painted red and showing a flashing white light, is moored on the eastern side of the dredged channel entrance. It is withdrawn in winter, and also for a few days every six weeks in summer for recharging with gas.

**Range lights.**—Two masts, 980 feet apart, stand on the western point of the north entrance to the branch. They are 18 and 25 feet (5.5 and 7.6 m.) high, respectively, and are surmounted by black triangles, the front one point upwards, the rear one point downwards. A fixed red light, visible 8 miles, is shown from the front mast and a fixed white light, visible 9 miles, from the rear. These beacons in range 182° lead through the dredged channel.

**Signal stations** (*45° 28′ N., 29° 40′ E.*).—A signal mast stands on each side of the entrance to Polunochnoe branch. From the eastern one, which has a yard, depth signals are shown. The western one is used for communicating with vessels in the roadstead.

The depth on the bar of the entrance channel is indicated by balls hoisted at the yardarms of the signal mast, as follows: A large ball indicates 6 feet (1.8 m.); a medium-sized ball indicates 1 foot

(0.3 m.); a small ball indicates 6 inches (0.2 m.). A depth of 12½ feet (4 m.) would thus be indicated by a large ball at each yardarm, with a small ball under one of them.

**Regulations.**—Vessels may use this channel at night by complying with the following regulations:

A ball by day or two lights (red over white) by night hoisted on the signal mast indicates that the Midnight mouth and channel are clear for a vessel proceeding out of the river.

When no signal is shown from the signal mast the entrance channel and mouth are clear for a vessel proceeding into the river from seaward.

Independently of any signal on the mast, every vessel must immediately communicate (by means of whistles, etc.), whether the channel be clear or not, with the vessels of the dredging flotilla at work in the Polunochnoe branch.

Steam tugs must fly a blue flag at the masthead by day and carry two masthead lights by night.

Vessels are only permitted to make fast to the right (eastern) bank of the Midnight mouth.

The draft of barges passing through the Midnight mouth must not exceed 1 foot less than the depth in the channel.

Sailing vessels drawing 8 feet and over must be towed through the channel.

Two balls by day or two red lights by night hoisted on the signal mast indicates that the channel is not clear for vessels either to enter or leave the river.

**Southern entrance—Light buoy.**—The southern entrance to Polunochnoe branch from the Danube is marked on the western side by a black buoy exhibiting a fixed red light.

**Range lights.**—Two masts stand on the eastern point of the southern entrance to Midnight Channel. They are 17 and 22 feet (5.2 and 6.7 m.) high, respectively, and are surmounted by black triangles. A fixed red light is shown from the front mast and a fixed white light from the rear. These beacons in range bear 357° and lead through the fairway.

**Vilkov** (*45° 24′ N., 28° 36′ E.*), situated at the junction of the Byelgorod branch with the main Kilia branch, is a fishing village of about 5,000 population and is the center of the fishing industry of the delta. The town is connected by telegraph with the Rumanian system.

For Danube ports above Vilkov see page 213.

**Coast.**—Beyond the Kilia mouths of the Danube the coast trends in a northeasterly direction for about 50 miles to the Tsaregradskoe mouth of the Dniester, and from thence a further distance of 20 miles to Cape Fontan, and is of the nature of a plain, low lying in places and only just above sea level, with occasional hillocks. At 2 miles northward of the village of Zhebriyani is Volchek Coast Guard Station, at which is a light, before mentioned.

A line of salt lakes extends about 27 miles from the coast-guard station to Burnas; these are separated from the sea by a narrow neck of dry sand. Sasik or Kunduk Lake, about 16 miles in length, has a depth of 8 to 9 feet (2.4 to 2.7 m.), and is connected with the sea by the Kunduk opening, which at times has a narrow channel of as much as 4 feet (1.2 m.), but it is usually almost closed by sand. The salt lake northeastward of it is known as Sagani Lake. Between Kunduk and Sagani Lakes are some villages 3 miles inland, but they are not easily made out.

The 5-fathom (9.1 m.) curve fronting this extent of coast lies from ½ to 1 mile from the shore, except at a point about 10 miles northeast of Volchek, where a shoal with depths of 21 to 23 feet (6.4 to 7 m.) extends nearly 3 miles from the shore; also south and north of Dniester Estuary, where it extends to a distance of 2 and 3½ miles, respectively. See also Off-lying banks, page 222.

**Cape Burnas** (*45° 49′ N., 30° 09′ E.*), as it is called, is the slightly higher land on the sand ridge at the southeast corner of the lake of the same name; on it is a guardhouse. A wooden quay has been built for the shipment of salt; it is about 200 yards in length, with a depth of 8 feet (2.4 m.) at its extremity; a patch of 7 feet (2.1 m.) lies southward of the quay head.

**Occasional light.**—A fixed white light, 59 feet (18 m.) high, is shown when required from a white post located near Burnas. It is shown during the navigation season from midnight until 5 a. m., except on Sundays.

**The coast** northward of Cape Burnas extends for 10 miles northeastward to Budaki guardhouse and is conspicuously higher than the coast north and south of it. Two sawmills are situated between the points mentioned, and also Balabanka village, near a mill in a valley. Fishermen's huts are seen at various points.

**Balabanka Cliff** (*45° 53′ N., 30° 15′ E.*) is a high cliff, and it is sometimes called a cape, although not at all prominent, and when seen from seaward it appears isolated between two large salt lakes.

**Coast—Aspect.**—From Budaki guardhouse to the Tsarigradskoe mouth Budaki Lake, 9 miles in length, is only separated from the sea by a low sand ridge. The water is deep fairly close in, with the exception of a flat extending about 2 miles off the shore at 7 miles from Budaki guardhouse, with depths of 3¼ to 3¾ fathoms (5.9 to 6.9 m.). The most conspicuous objects are: A white church with a cupola on the sloping land immediately beyond the guardhouse, Kodoeshti village lying on the western side of the lake, and the high Abembetski tumulus situated near the shore towards the Dniester Estuary, which is easily seen from seaward, but is not charted.

**DNIESTER ESTUARY—Aspect.**—About 12 miles northeastward of Budaki guardhouse is the entrance to Dniester Estuary, a large lagoon or salt lake formed by the waters of the Dniester before they reach the sea. It is 22 miles in length from northwest to southeast, 2¼ miles in breadth between Akkerman and Great Otorek Point, 6½ miles in its broadest part, and has a depth of from 5 to 9 feet (1.5 to 2.7 m.). The town of Akkerman is situated on the western shore, its buildings and cathedral being visible from the sea, and on the eastern shore are several villages.

The entrance to the Dniester Estuary, which may be recognized by a break of 5 miles between the cliffs, is formed by two tongues of sand with a low island in the middle, allowing the waters of the river a passage at either end. The channel to the northward is named the Ochakovskoe mouth and has a depth of about 3 feet (0.9 m.), but it is not used for navigation; that to the southward, and the deeper, is the Tsarigradskoe mouth, described below.

The Tsarigradskoe mouth is easily identified by the large and conspicuous clump of trees on the island forming its eastern side, in the middle of a stretch of land devoid of other vegetation. The high white tower of the lighthouse is also a conspicuous mark. On the island is also a farm with vineyards, and at its northeastern end a coast-guard station.

**The Tsarigradskoe mouth** (*46° 05′ N., 30° 29′ E.*) is alone made use of by vessels entering the estuary of the Dniester. The bar fronting it has a depth of 9 to 12 feet (2.7 to 3.7 m.) at times, but its direction and depth are much influenced by the wind. The least depth occurs during northwesterly winds. No stranger should attempt to enter without a pilot. The lights and beacons are altered to meet the changes as they occur. The water deepens immediately within the bar to about 5 fathoms (9.1 m.) between the entrance points, but reduces again to less than the bar depths a short distance above. It is a very useful refuge for craft under 7 feet (2.1 m.) draft.

**Buoys.**—The Tsarigradskoe Channel is marked by spar buoys; on the southern side by red spar buoys, surmounted by red inverted cones, on the north side by black spar buoys, the outer one being surmounted by a black cone with base downwards. In winter these buoys are withdrawn. They are not to be relied on.

**Tsarigradskoe Mouth Light.**—An occulting white light, 45 feet (13.7 m.) above the sea, visible 7 miles, is shown from a gray metal tower 41 feet (12.5 m.) high located on the south point of the Tsarigradskoe mouth.

**Range lights.**—Two range lights are shown from beacons on the south side of the entrance. The front or eastern light is fixed red, 23 feet (7 m.) above the sea, visible 9 miles, shown from a red gallows-shaped beacon 24 feet (7.3 m.) high, and is extinguished when navigation is closed. The rear or western light is fixed white, 35 feet (10.7 m.) above the sea, visible 11 miles, shown from a black mast with inverted triangle as top mark, 31 feet (9.4 m.) high, and its character is changed when navigation is closed. These beacons are moved as necessary to meet the changes in the bar. (See Light List.)

**Caution.**—In winter, and also when the direction of the channel changes to such an extent that the front beacon can not be placed, it will be removed and a light shown from the rear beacon only. The channel is very narrow.

**Wreck.**—A wreck with the bow about 10 feet out of water is reported to lie 4½ miles 86° from Tsarigradskoe Mouth Light.

**Lifeboat.**—A decked steam cutter and a 10-oared lifeboat are stationed at Bugaz, on the south side of the Tsarigradskoe mouth. There is also a life-saving station at Ovidiopol.

**Ice.**—Ice generally appears in the estuary at about the end of November and begins to disappear in the first half of the month of March. The average number of days is about 80, but it varies from 35 to 125 days. In severe winters the estuary has been covered with solid ice to a depth of 18 inches, when the inhabitants on either side cross over on it. See also paragraph Ice, page 58.

**Fogs.**—In summer fogs are rare. They usually begin about the month of October and continue until April. They are most numerous in March.

**Pilots.**—There is a pilot station on the southern side of the entrance.

**Tugs.**—A tug is obtainable by hoisting a triangular flag in the daytime and by exhibiting two red lights at night.

**AKKERMAN** (*46° 12′ N., 30° 20′ E.*) is a town of some size and includes Papuchoe, Krevba, and Turlaki extending westward from it, and the village of Shaba (Chaba) on the shore to the southward.

Wharves.—Five, with a depth of 4 to 5 feet (1.2 to 1.5 m.), used for loading grain in lighters.

Trade.—Principal exports from places in the estuary are grain, fish, and tobacco. There are a number of small craft engaged in transporting produce from the wharves to the Tsarigradskoe mouth, where vessels complete their cargo.

Communication.—Post and telegraph station; steam ferry across the estuary to Ovidiopol; steamer daily in summer to Odessa.

**Dniester Bank—Track.**—A bar with a fairway depth of 5 to 6 feet (1.5 to 1.8 m.) extends from the town of Akkerman, on the western shore, to the Dniester River entrance and the eastern shore of the estuary; there are depths of from 6 to 8 feet (1.8 to 2.4 m.) in the deeper portions of the estuary.

The best track through the estuary is marked by a dashed line on the chart. Shaba Shoal and the edge of the 6-foot (1.8 m.) curve southeast of Akkerman are marked by red spar buoys with upturned brooms.

**Dniester River.**—The Dniester River, the entrance to which is situated 15 miles from the Tsarigradskoe mouth, is navigable for vessels of 6 feet draft to Bender, 70 miles, at which place the railways from Jassy and Bucharest unite on the way to Odessa. Steamers ascend the river as far as Mayaki, about 8 miles, towing loaded lighters.

The flat fronting the northwestern approach to the entrance has been dredged to a depth of 8 feet (2.4 m.), but it requires constant dredging to maintain it; within the flat the depths are not under 13 feet (4.0 m.).

The fairway into the river is marked by four white perches on the starboard side and by four red spar perches on the port side, as charted, some of which are lighted at night.

**Depth signals,** to indicate the depth on the bar of the river, are made from a lookout house by means of balls, the larger ones each indicating a depth of 1 foot and the smaller ones a depth of 3 inches.

**Lights.**—Several lights mark the entrance to the river. For description see Light Light.

**Coast.**—From the Dniester Estuary to Cape Fontan, 19 miles, the coast consists generally of steep clay hills, which are subject to frequent landslides.

The shore bank, with depths under 5 fathoms (9.1 m.), extends 3½ miles offshore at about 4 miles northward of the Dniester Estuary, from whence it gradually reduces its distance to abreast a farm at about 5 miles southward of the cape, and is narrow and fairly steep-to until near the cape.

There are scattered farms, as charted, near the shore. The Baraboi stream, which dries, lies 8½ miles northward of Tsarigradskoe Lighthouse, and 1¼ miles northward of the Baraboi is Sandzhika pilot station.

The best distinguishing marks on the coast between the Dniester Estuary and Cape Fontan when approaching from the southeastward are the following: The white buildings of Buchova farm, about 6 miles southward of the cape; the gap caused by Sukhoi Liman, a salt lake 1¾ miles in extent situated 4½ miles southwestward of the cape, with Great Vakarsha Church, a long, low, white building, in the background, and another church on the shore of the lake also visible from the offing, the lake being separated from the sea by a low sand ridge similar to others along the coast, on which a few fishermen's huts may be seen; Lyustdorf village, in a ravine about 2 miles northeastward of the lake; and Kovalevskavo water tower, about 1 mile southwestward of the cape, which looks like a big chimney.

The only anchorage along the coast is off Lyustdorf, about 2½ miles southward of Cape Fontan. Here the bottom consists of mud and shells and the shore bank extends but a short distance.

**OFF-LYING BANKS—Morskaya (Dnyestrovskaya) Bank,** 3 miles in length north and south and less than a mile in breadth, with a depth of 3½ fathoms (6.4 m.) near its northern end, lies 8¾ miles 82° from Tsarigradskoe Lighthouse. Depths of 6 fathoms (11.0 m.) are charted for 2 miles westward and 3 miles southeastward of the bank, but eastward of it the depths are 10 to 12 fathoms (18.3 to 21.9 m.). Between the bank and the shore is a patch of 5 fathoms (9.1 m.), with depths of 6 to 7 fathoms (11.0 to 12.8 m.) in the neighborhood.

At about 21 miles 96° from Tsarigradskoe Lighthouse and 157° 22 miles from Cape Fontan is a bank with a least charted depth of 7 fathoms (12.8 m.), with 10 to 15 fathoms (18.3 to 27.4 m.) around; and at 31 miles 125° from Tsarigradskoe Lighthouse is another bank with a depth of 11 fathoms (20.1 m.) and from 12 to 16 fathoms (21.9 to 29.3 m.) in the vicinity.

The depths are very variable in the neighborhood of these banks and for some miles seaward of them, and other banks may exist, as the ground has only been sparsely sounded; but no dangerous patches seem to exist other than the Morskaya.

**Buoys.**—A black spar buoy with a cone, point upward, in about 5 fathoms (9.1 m.), marks the northern extremity of Morskaya Bank; and a red spar buoy in the same depth, with a cone, point downward, marks the southern extremity of the shoal.

**Range beacons.**—Three beacons have been erected on the hills at about 5 miles northward of Tsarigradskoe Lighthouse to mark the north and south ends of the bank should the buoys be adrift or out of position. The rear beacon, common to both, is a white shield 153 feet (46.6 m.) above the sea. The front beacon for the northern line is a red wooden shield, 87 feet (26.5 m.) above the sea, in line with the above, bearing 291°.

The front beacon for the southern line is a black wooden shield with a white vertical stripe, at an elevation of 118 feet (36 m.) above the sea: in line with the rear beacon, bearing 306°, it marks the south end of the bank. Consequently the rear beacon well open north or south of the respective front beacons will lead northward or southward of the bank. The shields are 30 feet (9.1 m.) in height and 15 feet wide.

**Caution—Local magnetic attraction.**—From an investigation it has been reported that local magnetic disturbance exists in the space comprised between these off-lying banks and Odessa, and in consequence the compass error is increased on approaching that port. From 2° to 5½° error has been observed. Caution should be exercised when navigating in this locality in thick weather; more to seaward the disturbance vanishes.

**Sandzhika (Sanjeika) Light** (*46° 13′ N., 30° 36′ E.*), occulting white, with red sector, 85 feet (25.9 m.) above the sea, visible 3 miles, is shown from an iron tripod with small cupola, 25 feet (7.6 m.) high, located on the top of a cliff about 11 miles southwestward from Cape Fontan. (Reported unreliable, 1925.)

**Buoys.**—Two red spar buoys are moored eastward of the above light in depths of 20 and 30 feet (6.1 and 9.1 m.).

**Coast.**—From Sandzhika toward Cape Fontan and Odessa the houses become more frequent and a number of mills are seen. In a ravine about 5 miles southwest from Cape Fontan is Sukhoi Liman, of considerable extent, and in another ravine to the northward is the village of Lyustdorf.

**Cape Fontan** (*46° 23′ N., 30° 46′ E.*).—This cape, situated about 6 miles southward of Odessa, rises perpendicularly 124 feet (37.8 m.) above the sea. On it is a disused white cylindrical stone lighthouse 65 feet (19.8 m.) in height. Near the lighthouse is a monastery. See Appendix IX, view F.

**Cape Fontan Light,** fixed white, 212 feet (64.6 m.) above the sea, visible 21 miles, is shown from a white cylindrical iron framework tower 90 feet (27.4 m.) high located about 400 yards northwestward of the summit of the cape. It is connected with the telegraph system. The light is not visible on bearings south of 197° on account of the high land to the northward.

**Fog signals.**—A fog siren and a bell are operated.

**Shoals** with depths of 6 to 21 feet (1.8 to 6.4 m.) extend 1 mile southwestward of Cape Fontan. A rocky patch of 14 feet (4.3 m.) lies 1,300 yards 48° from the old lighthouse, and 500 yards off the cape is a depth of 10 feet (3 m,). Vessels are accordingly recommended to give the cape a wide berth by keeping outside the 10-fathom (18.3 m.) curve.

**Buoys.**—A red spar buoy surmounted by a triangle, base upward, is moored 1,200 yards eastward from the old lighthouse to mark the extremity of the rocky ledge extending in that direction.

A red spar buoy is moored on the southeastern part of the rocky ledge at a distance of 900 yards southeastward from the old lighthouse.

**Adjustment of compasses.**—For the convenience of passing vessels adjusting their compasses it may be noted that Kovalevskago water tower, 66 feet (20.1 m.) high, when in line with Cape Fontan old lighthouse bears 246° 25′, and Cape Fontan new lighthouse when in line with the old lighthouse bears 326° 25′.

**Life-saving station.**—There is a life-saving station with a 10-oared boat at the mouth of the valley northward of the lighthouse. The station is supplied with first-aid appliances, and is connected with the lighthouse by telegraph in order to summon assistance to vessels in distress southward of the cape.

**Lanzheron (Langeron) Point** (*46° 29′ N., 30° 46′ E.*), situated 6 miles to the northward of Cape Fontan, forms the southern extremity of Odessa Bay.

**Landslides.**—A series of landslides have occurred along the coast for about 2½ miles southward of Langeron Point. The coastline has undergone a change, houses have been damaged, and whole blocks of ground shifted, the level of the land being lowered as much as from 105 to 140 feet.

**Shore flat.**—The 2-fathom (3.7 m.) curve is 600 yards offshore south of the point, with a patch of 1½ fathoms (2.7 m.) near its edge, and the 5-fathom (9.1 m.) curve is 1,100 yards off the point.

The Holy Cross Church at Peresip in range with Vorontsovski Lighthouse, bearing 327°, leads eastward of these in about 8 fathoms (14.6 m.); and Vorontsovski Light in sight at night leads clear in the same depth.

**ODESSA BAY,** between Langeron Point and Dembrovsk Point, is extensive and the depth of water quite sufficient for the largest vessels, but it is more or less exposed to the two most dangerous winds that blow on the coast, those from the south and southeast.

The northerly wind, which blows in the summer, although less injurious to vessels, is extremely unpleasant to the inhabitants of the town, since, especially during the hot days of July and August, it brings the dust from the parched plains and steppes, occasioning insufferable heat, which is only slightly diminished in the evening. Vessels lying in the bay should always keep their spare anchors ready to let go, as they may part in the heavy squalls. Most vessels now enter the spacious harbors.

The sandy plain of Peresip, at the head of the bay, is formed between two salt lakes separated by some table-land. Peresip, a suburb of Odessa, stands on the plain to the northward of the town. From thence the shore curves to the northeast toward Dembrovsk or East Point, which bears 5 miles 28° from Langeron Point. The greatest depth at the entrance of the bay is 8 fathoms (14.6 m.), which gradually decreases to the shore. In the northern half of the bay the depth is less than 30 feet (9.1 m.).

The shore of the bay is sandy to within 1½ miles of Dembrovsk Point; there it becomes cliffy, those at the point being 132 feet (40.2 m.) high, and steep.

The harbor of Odessa is in the southwest part of the bay, its shores being occupied by the port buildings.

**Shoals—Buoys.**—A shoal with 18 feet (5.5 m.) water lies near the middle of the bay, about 2.3 miles 54° from Vorontsovski Lighthouse. A red spar buoy with inverted cone topmark is moored close southward of this shoal, and there is a similar buoy about 400 yards southwestward.

About 1,600 yards northeast of it is another patch of the same depth, located on the edge of the 5-fathom (9.1 m.) curve.

About 1,300 yards southward is a patch of 30 feet (9.1 m.).

The church of the Blessed Virgin (five cupolas) in line with Vorontsovski Light, 250°, leads ½ mile southward of the 18-foot (5.5 m.) shoals.

**ODESSA HARBOR.**—The several sheltered areas composing Odessa Harbor are protected from the swell and from heavy seas by protecting moles and breakwaters. The easternmost breakwater, about 1,800 yards in length, is serpentine in shape; its inner part is the quarantine mole, covering quarantine harbor; the remainder is known as the Reidovi Mole, with Vorontsovski Lighthouse on its northern extremity. There is a short spur 50 yards long, probably intended as a wave catcher, at the inner end of Reidovi Mole. An iron pile 2 feet (0.6 m.) high is erected in 12 feet (3.7 m.) water just eastward of the quarantine mole.

The southern detached breakwater is about 1,340 yards long and its direction 293°, with an entrance at either end about 350 yards wide, the eastern having a depth of 32 feet (9.8 m.) and the western 20 feet (6.1 m.). The northern detached breakwater, direction 349°, has a completed length of about 1,000 yards, its projected length being about 1,210 yards. The work in progress on the northern portion is marked by beacons and lights, which are moved as the work advances.

**Buoys.**—The northern extremity of the breakwater under construction is marked by a red spar buoy and the southern extremity by a black spar buoy.

**Wrecks.**—Two wrecks of submarines with 11¾ feet (3.6 m.) over them lie nearly ½ mile 247° from Vorontsovski Lighthouse.

Two spar buoys painted in black and white horizontal bands, with red lights, mark the locality of these wrecks.

A sunken wreck, visible above water, lies 100 yards southward of Vorontsovski Lighthouse and is marked by a flat-topped mooring buoy close westward of it.

**Vorontsovski Light** (*46° 30′ N., 30° 45′ E.*), fixed and flashing red, 63 feet (19.2 m.) above the sea, visible 13 miles, is shown from a white iron tower 67 feet (20.4 m.) high located on the extremity of Reidovi Mole.

**A fog signal** is made by a siren. (See Light List.)

**The southern detached breakwater** is marked by a fixed green light on the eastern end and by a fixed red light on the western end. Both lights are 35 feet (10.7 m.) above the sea, visible 11 miles, and are shown from iron framework towers 31 feet (9.4 m.) high.

**Mole lights.**—Lights are shown from pillars or posts on the extremities of all the harbor moles, and also on the detached breakwater under construction. For descriptions of these lights see the Light List.

**Anchorage.**—The road comprises all the bay within a line joining Vorontsovski Lighthouse and Dembrovsk Point. The bottom consists chiefly of soft mud and shells.

Vessels can anchor in the bay or proceed into the inner road (also called Outer Harbor) within the main breakwater. Mooring bollards are placed at convenient distances along this side of the main breakwater, to which vessels moor while awaiting pratique or their turn for a berth. There are also several mooring buoys for the same purpose.

Foreign steamers generally use the anchorage outside the breakwaters, Russian steamers and small coasting craft anchoring within it.

**Prohibited anchorage.**—A submarine cable in connection with the electric lighting of the harbor is laid between the end of the southern detached breakwater and that part of the Reidovi Mole opposite it, and vessels are prohibited from anchoring near. The positions of the ends are marked by posts painted black and yellow and surmounted by boards having the word "Кабель" on them.

**The Quarantine Harbor**, with an area of about 45 acres, lies between the Quarantine (Karantinni) Mole and the Platonovski Mole. Vessels on arrival are berthed here by the pilot, and they must carry out all the quarantine and customs regulations here. This harbor is used also for the foreign export and import trade.

The entrance is 200 yards in breadth and the port is dredged to a depth of 24 feet (7.3 m.), and has a length of quayage of over 6,000 feet, with depths alongside from 28 to 30 feet (8.5 to 9.1 m.).

Every non-Russian vessel, even though not coming from a suspected place, is sent to this port and berthed by the pilot, and special limits are assigned for those who have to undergo quarantine.

**New Harbor.**—Westward of the quarantine harbor is New Harbor, with an area of about 35 acres, dredged to 26 feet (7.9 m.), with Platonovski Mole between.

**Middle Harbor.**—Westward of the new mole and between it and the military mole is Middle or Cabotage Harbor, with an area of about 30 acres, dredged to 20 feet (6.1 m.), at the head of which is the coasting craft quay.

**Pratique Harbor,** with an area of about 45 acres, ¾ mile northwestward of Quarantine Harbor and beyond the grand staircase which reaches from the upper part of the city to the quay mole, is used by coasting vessels and steamers engaged in regular service between Odessa and other Russian ports in the Black Sea. The entrance between Potapovski and Military Moles is 82 yards in width, and the port is dredged to a depth of 16 feet (4.9 m.).

**Dockyard Harbor.**—Westward of the Pratique Harbor, and protected by the western arm of Potapovski Mole is the Upravleniya Rabot Harbor, with an area of about 50 acres, the entrance channel and part of the northern portion being dredged to a depth of 20 feet (6.1 m.), the southern portion having a depth of 12 feet (3.7 m.), The southern portion of this harbor is occupied by slips belonging to the Russian Steamship & Trading Co. and to the Bellino Fenderich Co. The Russian Steamship & Trading Co.'s dockyard lies beyond the latter company's slips. It is formed by a wooden mole at the western limit of the dockyard extending 350 yards seaward, with an arm extending 420 yards southward from its outer end. It is known as the dockyard harbor, and its entrance lies between the extremity of the mole and the extension of the Potapovski Mole, known as the Upravleniya Rabot Mole.

**Grain Harbor.**—Northwestward of the dockyard harbor, between it and the Petroleum Harbor, the grain harbor is in course of construction. It will have an area of 85 acres, and, together with the Petroleum Harbor, is protected by the northern detached breakwater.

**The Petroleum Harbor,** with an area of about 70 acres, northward of the grain harbor, in progress, is formed by a mole, 800 yards in length, with an arm to the southwestward from its eastern end of about 260 yards. It has a depth of 24 feet (7.3 m.), except at the inner half of the north mole, where the depth alongside is only 10½ feet (3.2 m.). There are mooring buoys for berthing vessels in the harbor.

The breakwaters form a safe and commodious port protected from all winds and without tide, but the height of the water is slightly affected by the winds.

**Port regulations.**—Vessels on arrival should obtain a copy of the port regulations. Extracts from these are as follows:

No foreign vessels are permitted to enter or leave the port of Odessa unless the flag is shown from the quarantine establishment signifying that the officers are on duty.

Vessels are forbidden to anchor in the fairway.

Steam vessels are not permitted to enter the harbor at night. Vessels approaching the entrance by night should be ready to anchor as soon as the searchlight is turned onto them.

Vessels entering the bay or harbor must give way to vessels leaving.

The firing of rockets and .blue lights, the ringing of bells or frequent blowing of whistles, is prohibited, excepting as a signal of distress.

**Lifeboats and rescue stations.**—About 3½ miles to the eastward of Dembrovsk Point, on the neck of land separating Dofinovski Lake from the sea, a rescue station has been built and lifeboat established. The bell of the rescue station may be heard during fogs, but is not worked or intended as a fog signal.

A lifeboat is also stationed near Vorontsovski Mole Lighthouse; there is a refuge on Platonovski Mole, Quarantine Harbor, and a lifesaving station at Langeron Point.

**Storm signals** are hoisted on a mast on the spur at the junction of Quarantine and Reidovi Moles. See paragraph "Storm signals," page 33.

**Weather bulletins.**—Telegrams showing the state of the weather in the principal ports in the Black Sea are posted up daily in the Quarantine and Pratique Harbors.

**Winds and weather.**—The most frequent winds are from east and southeast; the east wind also has the greatest force. The southeast winds prevail in the spring and summer; in winter also they are very strong at times, throwing in a heavy sea and making entrance into Odessa Harbor difficult. The northerly winds cause a choppy sea, when strong, in the inner road. The east wind is the strongest on the average for the year. There is about 8 per cent of calm days, the greater proportion being in summer, the least in number being 1.3 per cent. See Meteorological table, Appendix III.

**Gales.**—Of an average of about 100 gales during the year, 39 occur in winter, 19 in spring, 6 in summer, and 36 in autumn. The least number in any one month occurred in July, 1 per cent; the greatest 16 per cent, in December. The main direction of these gales was east-northeast.

**Fogs.**—The month in which the greatest number of fogs occur is December, then February, and March. In winter there is 45 per cent of fog; in spring 29, in summer, 3½, and in autumn 22 per cent.

Spring and autumn fogs accompany the southwest and south winds; winter, northeast winds.

The above information is obtained from a period of eight years (1904–1911). See also Meteorological table, Appendix III.

**Ice.**—See paragraph Ice, pages 56 and 59.

**Water level.**—Northwest winds cause a fall of the sea level as much as 2 feet below the normal, and easterly winds the opposite effect; that is, the water level from this cause may be as much as 2 feet below and above the normal. See page 43.

**Pilots.**—Pilots are normally taken aboard off the quarantine mole.

**Ice breaker.**—When the port freezes the ice breaker, which is also a salvage boat, keeps the passages open and brings in and takes out vessels. Payment is exacted for attendance upon vessels. See page 63.

**ODESSA** (*46° 29′ N. 30° 45′ E.*), situated on the southern shore of the bay, though not immediately at the mouth of any great river, is only 30 miles from the channel or estuary receiving the streams of the Dnieper and the Bug, and about the same distance from the mouth of the Dniester. It is likewise well situated with regard to the Danube, being little more than 95 miles from the Sulina mouth. The city, situated upon a hill which descends rather abruptly toward the sea, has a pleasing aspect both from the interior and the sea. The cathedral, situated near the center of the city, has a tall spire which is visable for a distance of 18 miles when coming from the eastward.

A magnificent flight of steps, about 50 to 70 feet broad, leads down the cliff declivity, 80 feet (24.4 m.) high, to the shore and harbor. The blocks of stone of which the steps are composed are supported by arches, and the space between is open for traffic. There are steam tram cars in the thoroughfares and to the suburbs.

The city is fourth in size in European Russia; population 631,000.

**Quays.**—All piers and quays are electric lighted, and most of them are equipped with steam cranes for the handling of cargoes. There is a 40-ton floating crane. There are about seven warehouses along the quays into which grain cargoes can be handled direct. In addition to this there are about eight custom warehouses, located near the landing stage opposite the Platonovski mole. The latter have a capacity of about 10,000 tons each.

A railway extends all along the harbor wharves and onto the moles, and at the Bakaleinaya Quay it is raised, so that vessels can be loaded direct from the trucks by chutes and pipes.

**Tugs.**—There are several tugs stationed here.

A steamboat fitted with a powerful centrifugal pump is available for fire-extinguishing purposes.

**Dry docks.**—See Appendix I.

**Repairs.**—The Bellino Fenderich Co. has a foundry and machine factory, where small steam vessels are constructed. There are several repairing shops, but no large forgings can be made, nor are heavy plates or angles kept in stock. There are four floating cranes, with a lifting power of 25 to 40 tons, available in the port.

All kinds of repairs can be carried out in the floating dock and establishments of Russian Steamship & Trading Co.

**Supplies** of all kinds are usually obtainable, fruit and vegetables in their seasons being exceedingly good.

The water supply for the city is brought in pipes from the Dniester. Pipes are laid onto all the wharves and quays, and there are several drinking fountains.

**Coal.**—There are two berths in New Harbor reserved for coaling, traveling steam cranes being fitted for the purpose. Coaling is usually performed alongside in depths of from 12 to 26 feet (3.7 to 7.9 m.), or by lighters, and is in no way impeded by wind or sea. From 600 to 1,000 tons could be put on board in a day at the quay. Due to the difficulties of transportation, coal in Odessa is scarce and extremely expensive.

**Time signal.**—A black ball is hoisted on a white mast 38 feet (11.6 m.) high on the office of the Russian Steam Navigation Co., Quarantine Harbor, at 11.55 a. m., and dropped by hand at noon, standard time, corresponding to 10h $00^{m}$. $00^{s}$., Greenwich civil time.

A gun is also fired at the same time. (Time signal temporarily discontinued, 1924.)

An observatory is annexed to the time signal station. Chronometers can be regulated and repaired.

**Trade.**—The exports consist chiefly of grain, sugar, wood for building purposes, and poles; and the imports of coal, cotton, and general merchandise.

**Communication.**—By rail to Bucharest, Moscow, Vienna, Warsaw, and with the European system generally. Telegraphic communication with all parts of the world, and telephonic communication with Nikolæv and Kherson; cable to Constantinople.

**Radio.**—There is a radio station at Odessa, call letters RDE, wave length 600 meters. This station handles commercial messages.

**Hospitals.**—There is a military hospital, a town hospital, and local infirmaries.

# CHAPTER VI

## BLACK SEA—NORTHERN SHORE, ODESSA TO KERTCH STRAIT

**Coast.**—From Dembrovsk Point (*46° 33′ N., 30° 50′ E.*) the coast trends eastward for 23 miles to Adzhiyask Point and curves slightly to the northward, forming a long bay. The shore is of moderate height, steep, and of a reddish appearance, but a few lakes, separated from the sea by small bars of sand, and several villages break its uniformity.

**Depths.**—Off this coast a depth of 5 fathoms (9.1 m.) will be found from 1 to 1½ miles. Inside the 5-fathom (9.1 m.) curve the soundings are irregular, more especially in the vicinity of the Trutaeva Bank, 4½ miles west of Adzhiyask Point. Off the coast from 3 to 8 miles is an irregular bank named Odessa Bank, described on page 233.

**Dofinovski Lake,** the first of the above-mentioned lakes, about 3½ miles to the eastward of Dembrovsk Point, is separated from the sea by a low sandy isthmus on which is a line of telegraph posts and a lifeboat station. There is a conspicuous high chimney at the limekiln on the coast close westward of the lake.

**Novi Dofinovski,** near the lake, is a village with many white buildings and gardens; above it on higher ground are storehouses. A wooden wharf 420 feet long, with 12 feet (3.7 m.) at the end and from 9 to 4 feet (2.7 m. to 1.2 m.) alongside, extends off the village. It is used for shipping building stone and lime.

**Coast.**—Between Dofinovski and Adzhalikski Lakes, a distance of 4½ miles, the coast is high and the 3-fathom (5.5 m.) curve is from ½ to 1 mile offshore, but there are no dangers. This coast is intersected about midway by the fairly broad Nyemetskaya Valley, in which is the village of Chebanka.

The Adzhalikski Lake lies at right angles to the coast and is separated from the sea by a low isthmus similar to that of Dofinovski, over which is the main road and telegraph lines; but the lake is not seen until nearly abreast it.

The village of Grigorevka is situated at the southwest corner, with a coast guard station on the slope seaward of it.

Fishing lights are exhibited on the isthmus at a height of 18 feet (5.5 m.) in the season. On the eastern side of the lake is the village of Bukhtyeevka.

The coast between this lake and the Giligulski Liman (4¾ miles apart) continues high. It is of a reddish appearance and intersected by ravines, with a coast guard station about midway. At about 1 mile westward of Point C (Sichavka Point) is a broad valley, up which may be seen the large settlement of Sichavka, with its church visible on a northerly bearing.

Giligulski Liman is 3½ miles wide in its entrance, occupied by sand and marshy ground extending nearly out to Point C on the west side and to that on which is Koblevo Coast Guard Station on the eastern side. The village of Koblevo may be seen up the estuary, also on the eastern side.

Karabush village is situated in the valley at 1¼ miles eastward of Koblevo coast guard, with a coast guard station on the shore. Between the two stations is Point B (Karabush Point).

**Trutaeva Bank** extends 1 mile offshore abreast Point B, with depths under 3 fathoms (5.5 m.). Its extremity is buoyed and lighted, and described with the channel to Kherson Bay.

**Directions.**—Ochakov Point in range with the southern extremity of Berezan Island, bearing 86°, leads southward of the bank in 7 to 8 fathoms (12.8 to 14.6 m.).

Adzhiyask (Point A) lies 3½ miles eastward of Karabush coast guard. The shore flat extends about 800 yards off it and is marked by a red conical buoy. The village of the same name lies north of the point on the west shore of the bay.

**Berezan Island** (*46° 36′ N., 31° 25′ E.*) lies on the west side of the approach to Berezanski Liman and the north side of the approach to Kherson Bay, and is connected with Berezan Point, 1 mile northward of it, by a flat with depths of 3 to 6 feet (0.9 to 1.8 m.).

The island is about 1 mile in length north and south and the shores are steep and of a reddish color. The southern point is high. From thence the island falls toward the northward, and terminates in a low point on which boats can land. See Appendix IX, View G.

A light buoy showing a flashing red light marks the end of the spit extending southward of the island, and is mentioned below with the buoyage of Voenni Channel.

From the buoy southward of it the 3-fathom (5.5 m.) edge of the shore flat extends eastward and across the entrance of Berezanski Liman.

**Beacon.**—A wooden beacon 54 feet (16.5 m.) in height, surmounted by a latticework square and painted black, stands on the southern extremity of Berezan Island at an elevation of 114 feet (34.7 m.).

**Wrecks.**—The sunken wreck of a barge lies 1.8 miles 80° from the beacon on the southern extremity of Berezan Island.

A submerged wreck marked by a buoy lies about 1¼ miles southeastward of the same beacon.

**Ochakov Range Lights.**—The front light, fixed white, is shown from a beacon. The rear light, fixed red, is shown from a beacon consisting of two vertical posts with a crosspiece on top, 38 feet (11.6 m.) in height, situated on the roof of Ochakov Signal Tower.

These lights in range, bearing 70°, lead southward of the shallow water extending southward of Berezan Island.

**Range beacons.**—The channel south of Berezan Island is (1924) being widened to 700 feet, and two white framework beacons, each carrying a white shield with a black vertical stripe, have been erected on the shore, which in range, bearing 68°, will mark its new axis.

**Odessa Bank** extends to the westward from Kinburn Spit to within 9 miles of Odessa, or for a distance of about 22 miles, within the 5-fathom (9.1 m.) curve, and is about 5 miles in breath north and south, with irregular depths of 2¾ to 4½ fathoms (5 to 8.2 m.) and with outlying patches of 3 to 4 fathoms (5.5 to 7.3 m.) in places, as charted.

Within the western 10-fathom (18.3 m.) curve of the bank, in latitude 46° 30′ N., is a shoal 1¼ miles in length north and south, with a depth of 3½ fathoms (6.4 m.) marked by a buoy, mentioned below.

Eastward of the 5-fathom (9.1 m.) curve, about ¾ mile east of the shoal, the depths vary from 2¾ to about 4 fathoms (5 to about 7.3 m.).

**Voenni or Military Channel to Kherson Bay.**—The channel to the westward of Odessa Bank, which is maintained by the united currents of the Dnieper and Bug, carries a depth of 11 to 12 fathoms (20.1 to 21.9 m.). Its continuation northward of Odessa Bank, leading to Kherson Bay, is known as the Military Channel. It has a breadth of 1½ to 3 miles, with depths of from 10 to 5 fathoms (18.3 to 9.1 m.) over a bottom of mud and shells, and with the exception of a patch of 4 fathoms (7.3 m.) lying in the fairway 2¾ miles southward of the coast guard station at Grigorevka, and a 5-fathoms (9.1 m.) patch plying nearly 1 mile northwestward of it, is free from dangers.

**Buoyage—Southern side.**—A black spar buoy surmounted by a cone is moored on the western side of the 3½ fathom (6.4 m.) patch mentioned above near the western extremity of Odessa Bank.

A black and white spar buoy with a cross top mark marks the 4-fathom (7.3 m.) patch which lies off the northwestern extremity of Odessa Bank near the fairway.

The northern edge of the bank is marked by 3 pairs of black spar buoys, each buoy having a conical top mark.

The patches of 3¼ fathoms (5.9 m.) situated southeastward of the easternmost pair of spar buoys are marked by a black spar buoy with a conical top mark.

The buoys are not to be relied on.

There is a patch of 4½ fathoms (8.2 m.) between the western and middle pairs of spar buoys, and others of 3 and 3¼ fathoms (5.5 and 5.9 m.) between the eastern and middle pairs of buoys, but the fairway is well northward of them.

**Northern side.**—The northern side of the channel is marked by a light buoy showing a flashing white light, and painted in red and white checkers, moored approximately 3 miles southwestward from Grigorevka Coast Guard Station.

A black and white spar buoy is moored 2.7 miles southwestward from Grigorevka Coast Guard Station.

A red spar buoy with an inverted cone top mark is moored 1¼ miles offshore southward of Sichavka.

Trutaeva Bank, which extends 1 mile off the northern shore abreast Karabush, is marked at its extremity by two red spar buoys, each with an inverted cone.

A red conical buoy is placed on the edge of the flat extending southward of Adzhiyask Point in about 3 fathoms (5.5 m.).

A flat extending southward of Berezan Island is marked by two red spar buoys, each with an inverted cone, and by a light buoy. See page 232.

**Berezanski Liman,** northward of Berezan Island, extends about 14 miles to north-northeast. Seven miles within the entrance is a branch extending to northwestward which forms the estuary of the Zaseck River, while at the head of the main branch is the Berezan River. Neither of these rivers is of any importance, being dry in the summer. On the shores of this inlet are numerous villages, but the only one visible from seaward is Viktorovka, situated on the western side near the entrance in a ravine running in a north and south direction.

Beikushski Liman opens into Berezanski Liman on the eastern side of the entrance, and at its head is the town of Beikush.

**Bar.**—The entrance to the liman, nearly 800 yards wide, lies between a low point northeastward of Berezan Point and Berezanskaya Kosa. It is approached by passing over the flat fronting the entrance, with a depth of 7 feet (2.1 m.), but in the autumn, with northerly winds, not more than 6 feet (1.8 m.). Between the entrance points the depth is from 15 to 30 feet (4.6 to 9.1 m.), reducing again to about 11 feet (3.4 m.) close inside, and then deepening to 4 to 6 fathoms (7.3 to 11.0 m.) in the liman.

**Beacons.**—On the west side of the entrance is a black beacon. elevated 38 feet (11.6 m.) above the sea, consisting of a mast supported by wooden stays and slatted in front, appearing as a triangle, and surmounted by a St. Andrew's cross, and 1,300 yards 319° from this beacon is a similar beacon, also black, with a top mark consisting of six horizontal bars, elevated 44 feet (13.4 m.) above the sea.

**Directions.**—Small craft of 6 feet draft can enter Berezanski Liman by keeping these beacons in range bearing 319° afterwards passing between the black buoy and perches on the starboard hand and the red buoy and perches on the port.

NOTE.—Viktorovka Range Lights and Suvorov Light, which are situated near the entrance to Berezanski Liman, are to facilitate entrance to Kherson Bay and are described on page 239.

**Ferry.**—The estuary may be crossed by ferry at the entrance and at Kaze village (*46° 42′ N., 31° 28′ E.*).

**Directions—From off Odessa to entrance to Kherson Bay.**—There is no difficulty in approaching the entrance to Kherson Bay in clear weather, provided the light and other buoys maintain their positions. From about 4 miles eastward of Cape Fontan Lighthouse a course about 11° may be steered for Novi Dofinovski, the white houses of which are probably discernible, until the lighthouse at the extremity of Reidovi Mole, Odessa, bears about 250°, when it may be kept astern on that bearing, which leads northward of the 4-fathom (7.3 m.) patch marked by a black and white beacon, observing there is a 5-fathom (9.1 m.) patch northward of this line. From abreast the westernmost spar buoy steer up the fairway of the channel, passing about 1 mile northward of two other spar buoys on the north edge of Odessa Bank and southward of the buoys on Trutaeva Bank (Ochakov Church in range with Berezan Beacon, bearing 82°, leads north of Odessa Bank if buoys are out of place); from thence steer to pass about ½ mile southward of Berezan Island Light Buoy, observing that the signal station at Ochakov open southward of Berezan Island leads southward of the flat off Adzhiyask Point. From abreast Berezan Island, distant about 1,400 yards, beacon on the signal station and the northeastern beacon at Ochakov will be in range, bearing 70°, which being steered for will lead to the entrance of Ochakov Channel in not less than 28 feet (8.5 m.). These marks are said to be difficult to pick up. Anchorage may be taken southeastward of Berezan Island in about 4½ fathoms (8.2 m.). Continued at page 242.

**KHERSON OR DNIEPER BAY—General remarks—Depths.**—This extensive bay or arm of the sea is upward of 30 miles long in an east and west direction and from 3 to 8 miles in breadth. Receiving as it does the waters of the Dnieper and the Bug Rivers, which discharge their turpid streams into a tideless estuary, it is shallow for the most part, but a channel of 25 feet (7.6 m.) has been dredged to allow access to the Bug River, on which, at Nikolaev, a large Russian dockyard and shipbuilding establishment is situated. The Kherson dredged channel leading to the Dnieper River entrance has a depth of about 24 feet (7.3 m.).

The entrance to Kherson Bay is between Ochakov Point and Kinburn Spit, and the approach is either northward of the Odessa Bank, where the fairway depth is not less than 5 fathoms (9.1 m.), or from the southwestward, between the eastern edge of the Odessa Bank and the shallow water extending from Kinburn Spit, where not more than 15 feet (4.6 m.) can be depended on. Only craft with local knowledge could take the latter.

**Bottom.**—In the deeper part of Kherson Bay and the Bug River the bottom is soft mud, except where cross sand ridges are forming. The shoals at the mouth of the Dnieper River are of hard sand.

**Currents.**—In Kherson Bay and in the Dnieper and Bug Rivers the strongest outward current, caused by the melting of the snows, will be found in April and May. It is said the current never exceeds 2 knots. In the fall of the year it is but slight in Kherson Bay and uncertain in direction in the Bug River, where it is influenced by the prevailing wind.

**Water level.**—The water level is highest from April to June and lowest in the autumn. Fresh winds raise or lower the water about 1 foot in Kherson Bay and 3 feet in the Bug River.

**Ice.**—See pages 60 and 61.

**Ice breakers.**—The channels to Nikolaev and Kherson are kept open throughout the winter as far as possible by means of ice breakers.

**Pilots.**—The pilots of the Nikolaev association have the exclusive right of conducting seagoing vessels eastward of the meridian of Suvorov Lighthouse to any of the ports beyond and on return. The pilot flag is hoisted on board the pilot vessels. These vessels have a red stripe in the middle of the sail, with the number of the vessel in large figures. The signals for a pilot are the usual International Code signals. Pilots will not take vessels through any of the dredged channels with less than ½ foot of water under their keel. Pilotage is compulsory for merchant vessels bound to ports in Kherson Bay or in the Bug River. Pilots are stationed at Odessa, Ochakov, Nikolaev, and Kherson. The pilots' watch house is situated on a mound on the eastern side of Ochakov Point; by day the pilot flag is flown from a mast near the watch house.

**Ochakov Point** (*46° 36′ N., 31° 33′ E.*) is situated on the north side of the entrance to Kherson Bay. It is high, with bluff shores. On the point is a battery, above which is the town of Ochakov, visible from a considerable distance.

For description of the range lights on Ochakov Point see page 233.

**Ochakov Flat** extends 1½ miles southward of the point, from which it extends the same distance northwestward, terminating in a narrow horn. It has depths of about 8 to 15 feet (2.4 to 4.6 m.) and is steep-to on the south or channel side.

**Landmarks.**—The most conspicuous objects are the church, the chimney of the brick works, and the signal station, a tower 89 feet (27.1 m.) high with its top 204 feet (62.2 m.) above the level of the sea. Near it is a mast with yard for communicating with naval vessels.

**Light buoy.**—A white light buoy showing a red, blue, and yellow fixed light is moored 400 yards eastward of Ochakov Pier. The light is only exhibited occasionally.

**Anchorage.**—Vessels proceeding to Ochakov may anchor westward of the point and town in from 3½ to 5 fathoms (6.4 to 9.1 m.). Those under 16 feet draft may anchor off the pier on the east side of the town, in the military roadstead, in about 18 feet (5.5 m.).

**Signal station.**—Telegrams will be received from vessels at the signal station by International Code and forwarded to their destination, to be paid for on delivery.

The depth in the dredged channel is shown from the signal station. See page 241.

Storm signals are shown. See page 33.

**Lifeboats.**—There are two lifeboats stationed on the eastern side of Ochakov Point; one of them is fitted with runners.

**OCHAKOV**, on Ochakov Point, had in 1904 a population of 12,300.

**Piers.**—A pier on the west side of town has 14 feet (4.3 m.) at outer end. Quarantine Pier, east side of town, has 6 to 8 feet (1.8 to 2.4 m.) alongside. Military Pier, near extremity of point and connected with railroad, has depth of 2 feet (1.5 m.).

Communication by steamer with Odessa and other parts. Telegraph station and mail facilities.

Quarantine and customs officers board vessels here. There is a hospital.

**Kinburnski (Kinburn) Peninsula.**—The southern shore of Kherson Bay, formed by Kinburn Peninsula, is low and sandy, and terminates to the westward in Kinburn Point at about 1 mile beyond Fort Kinburn (*46° 33′ N., 31° 32′ E.*). It is low, narrow, and subject to inundations.

**Kinburnskaya Kosa (Kinburn Spit)** extends 1.6 miles beyond the point, its extremity, in 3 fathoms (5.5 m.), being distant 2.2 miles westward of Ochakov, on the north side of the entrance. It was reported in 1919 to be entirely uncovered.

**Directions.**—The signal tower on Ochakov heights in range with the northern beacon below it, bearing about 70°, leads clear northwestward of Kinburn Spit. The signal tower should be opened to the westward when passing near the spit. The range marks are somewhat difficult to recognize.

**Beacon.**—Near the extremity of Kinburn Point is a black pyramidal iron framework beacon surmounted by a ball and elevated 36 feet (11 m.) above the sea. It is on the prolongation of the line of Adzhigiol Lights.

**Buoys.**—The northwest extremity of the spit is marked by a light and whistle buoy painted white and showing a flashing white light, the northern extremity by a black spar buoy with a conical top mark, and the eastern side by two black spar buoys each with a black flag.

**Obstruction.**—A sunken obstruction is reported (1924) to exist 2½ miles 219° from the above beacon.

**Wreck.**—A wreck marked by a black spar buoy with cone top mark lies in the channel eastward of Kinburn Spit and 2.9 miles 163° from Suvorov Light.

**Fort Nikolaev.**—An artificial islet is situated nearly 1¾ miles to the eastward of Kinburn Point. On it stands a battery, known as Fort Nikolaev.

**Anchorage.**—Vessels can anchor eastward or westward of Ochakov Point, according to their draft. Vessels must avoid anchoring on the line of the range lights or beacons.

**Prohibited anchorage.**—A telegraph cable connects Ochakov with Fort Nikolaev. The route is marked by spar buoys surmounted by flags. Anchorage is prohibited in the vicinity of this cable; also in a space northeastward of the fort near the entrance to the dredged channel, the limits of which are shown on the chart.

**Lifeboat.**—At Fort Nikolaev there is a lifeboat on runners.

**North shore.**—Between Ochakov Point and Adzhigiol Point, a distance of about 10 miles, the nothern shore of Kherson Bay trends northeastward and eastward, forming a bay, the shores of which are high and composed of clay. In this bay, intersected by three ravines, are several villages nearly continuous, namely, Kuchurubi, Ivanovka, Yaselka, and Chefutova. Between the latter and the point are the two Adzhigiol white lighthouses. The pilot master's tower, on an eminence at Ivanovka, is conspicuous; it is a broad, yellow, eight-sided tower near the village.

**Adzhigiol Point** (*46° 37′ N., 31° 49′ E.*), situated to the southward of Adzhigiol Valley, is low and marshy. A bank with depths of under 2 fathoms (3.7 m.) extends to the southward of the point as far as the dredged channel, which here divides into two branches, one leading into the Bug River and the other to Stanislav and the Dnieper River.

**South shore—Kinburn Point to Prognoisk village.**—The south coast of Kherson Bay trends southeastward for 3½ miles, then to eastward for 7 miles, when it again trends southeastward, forming a low, sandy point, on the eastern side of which, and opposite Adzhigiol, is the village of Skadovka.

**Prognoisk village—Anchorage.**—Four miles farther to the southeastward is Prognoisk, which has a church and a pier where salt is loaded. Eastward of this village a low narrow point covered with reeds extends 1 mile in a northwesterly direction, forming opposite the village a bay sheltered from the swell where small vessels can anchor in from 5 to 6 feet (1.5 to 1.8 m.) of water.

**Buoys and beacons.**—A red iron buoy is moored on the edge of the horn of the flat, eastern side of the approach to the above anchorage, and a black spar buoy with a black flag at 200 yards northwest of it on the edge of the western flat.

Two mast beacons have been erected on the shore west of Prognoisk 840 yards apart. The front beacon is 41 feet (12.5 m.) above the level of the sea and surmounted by a triangle, base upward. The rear beacon is 45 feet (13.7 m.) above the sea and is surmounted by a triangle, base downward. In range 132° these beacons lead between the buoys and up to the anchorage in about 8 feet (2.4 m.).

**Lights.**—The lights in Kherson Bay and in the Bug River are exhibited throughout the year.

The lights in the approach to Kherson Bay are as follows:

**Victorovka Range Lights and beacons.**—The front or lower light, fixed red, 48 feet (14.6 m.) above the sea, visible 12 miles, is shown from a white iron quadrangular truncated pyramid 27 feet (8.2 m.) in height on a low cliff near Berezan Guard, at the east side of Berezanski Liman.

The rear or high light, fixed white, 120 feet (36.6 m.) above the sea, visible 17 miles, is shown from a white iron quadrangular truncated pyramid 43 feet (13.1 m.) in height on the heights on the west side of Berezanski Liman.

A black pyramidal beacon with spherical top mark stands close to the front lighthouse.

A black beacon, consisting of a mast carrying a rectangular framework and surmounted by three short horizontal crosspieces, stands close to the rear lighthouse.

These lights or beacons in range, bearing 315°, astern, lead through the first section of Ochakov dredged channel eastward of Kinburn Spit.

**Suvorov Light,** fixed white, 147 feet (44.8 m.) above the sea, visible 14 miles, is shown from a white house 20 feet (6.1 m.) in height situated on Potemkin Hill, about 2 miles eastward of Victorovka front range light.

**Fort Nikolaev Range Lights.**—The front light, fixed red, 45 feet (13.7 m.) above the sea, visible 12 miles, is shown from a white iron framework support 17 feet (5.2 m.) in height situated at the entrance to Kherson Bay.

The rear light, fixed white, 63 feet (19.2 m.) above the sea, visible 12 miles, is shown from a red wooden support situated 49 yards 92° from the front light.

These lights in range lead through Ochakov Channel from the line of the Victorovka Range Lights to the line of the Adzhigiol range lights.

**Fog signal.**—A fog signal is made by a bell at the front lighthouse.

**Life-saving station.**—There is a life-saving station at the front light.

**Adzhigiol Range Lights.**—The front light, fixed red, 112 feet (34.1 m.) above the sea, is shown from a square masonry tower painted red 19 feet (5.8 m.) in height situated about 9 miles eastward of Ochakov Point and westward of Adzhigiol village.

The rear light, fixed white, 170 feet (51.8 m.) above the sea, is shown from a white square masonry tower on a dwelling 40 feet (12.2 m.) in height situated 1,380 yards 69° from the front light.

These lights in range lead through the first reach of the dredged channel after leaving the line of Fort Nikolaev Range Lights. These lighthouses are not easy to see.

**Beacons.**—A beacon stands behind the front lighthouse to render the range line more visible by day. It consists of two masts with stays, 42 feet (12.8 m.) in height and 145 feet (44.2 m.) above the level of the sea, each surmounted by a half sphere, base vertical, between which the rear light tower can be seen.

Two white beacons, the front one having a black triangular top mark and the rear one a black square top mark, stand on Adzhigiol Point; in range 354°, they indicate the pile foundations at the eastern end of the second reach of the Ochakov dredged channel.

**Ochakov dredged channel** extends from a short distance eastward of Ochakov Point to abreast of Volosh Spit in the Bug River, a distance of 21 miles, and is divided into five reaches. This channel varies from 245 to 330 feet wide at the bottom and has (1919) a least depth of 25 feet (7.6 m.). Vessels should keep strictly to the center, excepting off Adzhigiol Kosa, where they should keep to the southward. Vessels drawing more than 27½ feet are not allowed to use it.

**Lights, beacons, buoys, etc.**—The dredged channel is marked by black spar buoys surmounted by cones, points upward, on the starboard (southern and eastern) side, and by red spar buoys with cones, points downward, on the port (northern and western) side. The spar buoys are placed in pairs about ½ mile apart, except at the bends, where the distance between them is lessened.

In addition to the spar buoys, the second reach is marked at its western end by two pile lighthouses, the northern light showing flashing red and the southern flashing white, each 30 feet (9.1 m.) in height and consisting of a reservoir on an iron column surmounted by a lantern and painted, the northern one white and the southern one black.

Two light buoys are moored near the pile foundations at the center of the reach and two more at its eastern end; those on the northern side are painted red and those on the southern side black, the lights on the center buoy being fixed red and fixed white, respectively, and those on the eastern ones fixed red and fixed white, respectively.

The wreck of a lighter lying on the pile foundation on the south side of the middle of the reach is marked by a post carrying a light.

A red light buoy with pyramidal superstructure, exhibiting a group occulting red light, is moored on the western side of the junction of the third and fourth reaches, southward of Sakena Point. This light buoy is reported to have been removed.

These light buoys can not be depended upon.

Note.—The pile lighthouses and the foundations mentioned above are situated about 280 feet from the axis of the channel. These foundations are marked in the winter by white spar buoys arranged round them, also by spars with bundles of straw placed on the ice as near their position as possible.

**Regulations.**—The following regulations apply to the Ochakov dredged channel and the Bug River as far as the Varvarovka Bridge:

All vessels of 15½ feet draft or less must give way to those of greater draft.

Deep-draft vessels that can not go out of the channel will carry a black ball at the masthead by day and a red light above the masthead light by night.

Vessels meeting must slow down and pass according to international regulations.

When vessels are meeting at bends the vessel coming from seaward must stop ¼ mile short of the bend until the other vessel has passed her.

Speed must not exceed 10 knots in the channel or 8 knots when approaching Nikolæv.

**Depth signals.**—The least depth of water in the channel from Ochakov to the Bug River is indicated at Ochakov from a mast near the pilots' observation station and also at Ilinskoe (*46° 41′ N., 31° 55′ E.*), by means of the undermentioned signals hoisted at the yardarms of the flagstaff, thus:

A black triangular shape indicates a depth of 21 feet (6.4 m.).

A black rectangular shape indicates a depth of 23 feet (7 m.).

A large ball in addition to the above indicates that 1 foot (0.3 m.) should be added.

A small black ball on the opposite yardarm indicates an additional 3 inches.

A red triangular flag will also be hoisted on the flagstaff when the depth in the channel is decreasing or when the ice in the river estuary is moving, and a white triangular flag when the depth in the channel is increasing or the ice is stationary.

The above signals will be repeated from a flagstaff 56 feet (17.1 m.) high erected on Volosh Spit.

**Dredging.**—The area in which dredgers are working is usually marked by white buoys. Vessels drawing less than 13 feet of water should leave the channel and pass northward of the dredger. Vessels of greater draft should give three prolonged blasts on the whistle and reduce speed. The dredger will then get as far as possible out of the fairway.

The Bug River is described at pages 248 to 258.

**Directions for Kherson Bay.**—Continued from page 235.—From about ¾ mile southward of Berezan Island steer up with the beacon on the signal station tower on Ochakov heights in range with the northern beacon (two vertical posts with crosspiece), bearing 70°, in not less than 28 feet (8.5 m.), northward of Kinburn Spit until the Victorovka beacons are coming in range, when course should be altered in good time to bring them in range, astern, bearing 314°, which leads eastward of Kinburn Spit between the black buoys marking the spit and the red buoys marking Ochakov Spit, on the opposite side of the entrance.

See paragraph Wreck, page 238.

When the two light structures on Fort Nikolæv are in range (course being altered in good time to bring them so), bearing 92°, they must be steered for until the Adzhigiol Lighthouses come in range ahead, bearing 69°, which will lead through the channel between the black beacons on the south side and the red beacons on the north side until abreast the pile lighthouses at the western end of the second reach, when steer between the lines of buoys and beacons, carefully keeping the center of the channel, especially when near the center pair of light buoys, as the channel is narrower here. Before reaching Adzhigiol Kosa keep slightly to the southward of the channel.

Vessels of less than 15½ feet draft are required to keep from 300 to 400 yards on either side of the dredged fairway for large vessels.

**By night.**—To enter Kherson Bay by night approach the Surorov Light within its arc of bright white light, and when Victorovka Lights are in range steer in, keeping them in range astern until the lights from Fort Nikolaev are in range, when they must be steered for; then Adzhigiol Light in range will lead through the channel until the lights marking the sides of the channel bear 89°, after which steer between the lights. These remarks are merely a guide, as pilotage is compulsory eastward of the meridian of Suvorov Light.

Directions for the Bug River will be found at page 254.

**RIVER DNIEPER APPROACH.**—The southern shore of Kherson Bay trends to the eastward from Prognoisk (*46° 31′ N., 31° 54′ E.*) and continues low and sandy. Nearly opposite Cape Stanislav are the low islands Verbki and Yanushov, the latter being recognizable by the trees on it.

Northeastward of Verbki the shore flat extends 1½ miles offshore within a depth of 3 fathoms (5.5 m.). Between it and the flat which extends about the same distance southward of Cape Stanislav is a pool or depression 4 miles in length, with depths of 19 to 40 feet (5.8 to 12.2 m.) through which the dredged channel passes.

From Yanushov Island the shore trends to the east-southeast for 6 miles as far as to Zburevka Bay, the entrance to which is partially blocked with reeds on either side of the fairway.

**Fog signal.**—A fog bell is located on Verbki Island.

**Ice.**—The Dnieper estuary is covered with ice from the beginning of December and is clear of ice generally in the middle of March. See pages 60 and 61.

**Buoyage.**—The buoys are laid out about the middle of March, when the estuary is free from ice, and withdrawn in the latter part of November. The buoys can not be depended upon.

**Northern shore.**—From Cape Bublikov, on the eastern side of the entrance to the Bug River, the coast trends eastward and southward to Cape Stanislav, forming a bay in which is the village of Aleksandrovka.

**Cape Stanislav** is salient and steep, and has a large village with a church and several mills situated on it.

A bank with less than 6 feet (1.8 m.) of water extends 1 mile southward from the cape, beyond which are stakes on the edge of the dredged channel.

**Wreck.**—A wreck lies sunk about 5½ miles 252° from the small islet at the extremity of Cape Stanislav.

**Kizim Point** (*46° 33′ N., 32° 20′ E.*), on the north side of the Rvach entrance to the Dnieper, which is steep and of a reddish color, lies 7½ miles eastward from Cape Stanislav, the coast between being high and forming a bay in which are the villages of Shirokaya and Sofievka.

**Buoy.**—A red conical buoy is moored about 500 yards south of Kizim Point. This buoy marks the sunken wrecks of two barges.

**Kherson dredged channel.**—This channel, which has a width of 350 feet and is available (1924) to vessels drawing not more than 21 feet, branches off from the Ochakov Channel abreast of Adzhigiol Point and runs east-southeastward for 12½ miles until northward of Verbki Island, thence from southward of Cape Stanislav for 6 miles in an east-northeasterly direction to the Rvach Light Vessel, where it turns into the Rvach or northern entrance to the Dnieper with a depth of 20 feet (6.1 m.).

**Range lights.**—The front light, fixed red, 87 feet (26.5 m.) above water, is shown on the beacon near the northern end of Yanushov Island, 3.8 miles 181° from Stanislav Cross.

The rear light, fixed white, 221 feet (67.4 m.) above water, is shown from a beacon 3.6 miles 110° from the front light.

**Buoys.**—The northern side of the channel is marked by red spar buoys with inverted cones and the southern side by black spar buoys with upright cones.

**Stanislav Light Vessel** (*46° 32′ N., 32° 07′ E.*)—Two fixed red lights, one on each mast, 38 feet (11.6 m.) above water, are shown from a light vessel moored off the entrance to the dredged channel in the approach to Kasperovka, 2¾ miles 212° from Stanislav Cross.

The light vessel has two masts with a red ball day mark at each masthead; the hull is painted black with red bulwarks.

**Regulations.**—The lower limit of the port of Kherson is a line joining Adzhigiol Point and Skadovka village.

Vessels must have at least 1 foot water under their keel.

The channel is marked where necessary by buoys, red on the north side and black on the south. (In the Dnieper River the buoys on the south side are painted white.)

During the spring floods the channel is marked by special beacons.

Rafts show a light at each end.

When vessels are lying alongside each other the white stay lights are only obligatory for the vessels nearest the channel and those at either end.

All anchors must be buoyed.

Vessels must not anchor between beacons marking cables or pipes. Cables are marked by black and yellow beacons with white inscriptions, and pipes by white and black beacons with red inscriptions.

Vessels are not to anchor in the channel.

Vessels stopping must leave the channel clear for other vessels.

Vessels passing a dredger must go dead slow and sound a prolonged blast on a whistle or horn.

Dredges getting under way show a red flag and black ball on each side; other vessels must then wait until she is under way. When moored she will lower the flag and ball on the side of the clear passage. At night the balls are replaced by red lights.

Vessels meeting are to slow down and keep to the starboard side of the channel.

Vessels crossing must give way to all vessels coming up or down the river.

Vessels are not to pass each other at a bend. The vessel from seaward must stop at least ¼ mile below the bend until the vessel coming down has passed her.

Vessels approaching a bend, where it is impossible to see vessels approaching from the opposite direction in good time, must sound a long blast on a whistle or horn.

Vessels intending to overhaul others must signify their intention by whistle or horn.

Vessels must be guided by the depth signals. See page 247.

**RIVER DNIEPER.**—The length of the Dneiper, following its course, is 1,217 miles, and the direct distance from its source in the Province of Smolensk, in the marshes at a height of 830 feet (253 m.), to its mouths is about 550 miles. It is proposed to cut out the rapids about 180 miles up by a new channel or lock, which would largely add to the commerce of the country. Below the rapids the river is navigable from Aleksandrovsk.

The Dnieper River flows into Kherson Bay by nine mouths, which form clusters of islands covered with reeds and mostly uninhabitable. The mouths actually used are the northernmost, known as the Rvach entrance, and the Zburev entrance, 3½ miles to the southward of it.

The Dnieper is connected through the Prypot River to the Bug River by a channel.

**Ice.**—According to observations at Kherson during the period 1887–1897, the Dnieper was covered with ice on or about December 8, and broke up about February 25. In late years the duration of navigation has increased by 3 weeks, and averages 10 months and 3 days.

The Kherson and Rvach dredged channels are now kept open so far as possible by means of ice breakers. See page 60.

**The current** in the river at Kherson is usually from ½ to 2 knots, but during the floods its rate reaches 7 knots at times, rendering navigation somewhat dangerous.

**Pilotage** is compulsory eastward of the meridian of Suvurov Lighthouse, entrance to Kherson Bay, even to vessels being towed (half fees), and the full fees will be exacted from seagoing vessels not taking a pilot. See page 236.

**Rvach entrance,** which opens immediately southward of Kizim Point, is formed by two dikes running out into the bay in a northwesterly direction, the southern having a length of 1,260 yards and the northern one being 875 yards in length.

**Depths.**—The channel from Rvach entrance to Kherson was available in 1924 for vessels drawing up to 21 feet. In the spring, when the river is high, vessels of greater draft can use the channel, special permission being obtained in each case from the chief of the port.

**Rvach Light Vessel** (*46° 32′ N., 32° 17′ E.*) shows two fixed white lights, one at each yard arm. It has a black hull and two masts, and is moored on the southern side of the dredged channel at 1½ miles from the entrance.

**Fog signal.**—A fog signal is made on a bell on the light vessel.

**Kasperovka Range Lights.**—The front light, fixed red, 46 feet (14 m.) above the sea, visible 12 miles, is shown from a white stone dwelling with tower 10 feet (3 m.) in height situated near the village of Kasperovka and northward of Kizim Point.

The rear light, fixed white, 91 feet (27.7 m.) above the sea, visible 15 miles, is shown from a red stone tower, 56 feet (17.1 m.) in height bearing 76° from the front light.

These lights in range lead through the dredged channel from Stanislav Narrows up to Rvach Light Vessel.

**Rvach Range Lights.**—The front light, fixed red, 28 feet (8.5 m.) above the sea, is shown from a black mast with top mark, 43 feet (13.1 m.) in height, situated on a low islet near Kizim Point.

The rear light, fixed white, 50 feet (15.2 m.) above the sea, is shown from a black mast with top mark, 58 feet (17.7 m.) in height, bearing 97° from the front light.

These lights in range lead through from Rvach Light Vessel to the entrance of Rvach River.

**Training wall lights.**—The southern training wall is marked by three lights, one on its outer end, one at its bend, and one on its inner end.

The outer and inner extremities of the northern training wall are each marked by a light.

**Buoys.**—The channel of the river from the Rvach entrance to Kherson is marked on the northern side by red buoys and beacons and on the southern side by white buoys and beacons, and where lighted the lights are of the same color as the buoys or beacons.

**Zburevka entrance** (*46° 30′ N., 32° 18′ E.*) is the southern mouth of the Dnieper, and is situated close northward of the bay of the same name.

The pilot police station, a yellow house with a red roof surmounted by a tower, stands on the northern side of the entrance. A mast with yard stands close to it.

**Depths.**—The dredged channel has a total length of 9,450 feet, with a bottom width of 350 feet. In 1924 the depth in the dredged channel was only 6 feet (1.8 m.).

**Depth signals.**—The following signals indicating the depth in the channel are shown from the light vessel, Zburevka pilot police station, and on the Dnieper quay, but only those acquainted with the river should enter it:

Each long cylinder indicates a depth of 10 feet (3 m.).

Each short cylinder indicates a depth of 1 foot (0.3 m.).

Each ball indicates a depth of 3 inches (0.1 m.).

A white flag below the signal indicates that the tide is rising; a red flag that it is falling.

At slack water no flag is hoisted.

**Zburevka Light Vessel** shows two fixed white lights, one at each yardarm. It has a white hull with black bulwarks, two masts, a yardarm on the foremast, and a black ball at each masthead. It is moored on the south side of the entrance channel.

**A fog signal** is made on a bell on the light vessel.

**Buoys.**—The channel above the light vessel is marked by 10 red buoys with red lights on the north side, and by 7 white buoys with white lights on the south side; also by iron buoys and spar buoys placed between the light buoys. The spit extending southwest from the pilot station is marked by a red and white buoy exhibiting a white light under a red light. The buoys are laid out early in March, as soon after the lower Dnieper is clear of ice, and the lights are exhibited. Early in November the spar buoys (winter buoyage) are placed in lieu of the above.

**Directions for Dnieper entrances.**—From Adzhigiol Point follow the dredged channel, which is marked by spar buoys, as far as the Stanislav Narrows, thence, if bound for the Rvach entrance, steer through the Rvach Channel, marked by spar buoys by day and by range lights at night.

If bound for the Zburevka entrance, after passing Stanislav Narrows steer for the light vessel on the south side of the approach. Pilotage is compulsory.

**Kherson Road limits.**—The limits of the roadstead of Kherson are the water expanse opposite the town and Karantinni Island, southwestward of it, almost as far as Mali Potemkin Island, with a width of from 1,400 to 2,450 feet.

**Ice.**—The port may usually be considered to be open from the end of February to the end of December of each year. See page 60.

**KHERSON** (*46° 38′ N., 32° 37′ E.*).—The town stands on the right bank of the Dnieper, where it is ½ mile in breadth and 30 to 40 feet (9.1 to 12.2 m.) deep. It is built in a semicircular form on a slight elevation, sloping down to the river at its junction with the Koshevaya branch, and has an estimated population of about 70,000.

**Piers—Berthing.**—There is being built (1913) a Government masonry quay 3,675 feet in length along the right bank of the river. There are two Government piers, a town pier, and the pier of the Russian Steam Navigation & Trading Co.

On the right bank of the Koshevaya are piers belonging to various steamship companies, total quayage 2,800 feet, all lighted. There are 19 floating elevators, and a 10-ton floating crane. Three cambers are situated on the opposite side of the river; each has a depth of 14 feet (4.3 m.).

Vessels are berthed under the direction of the harbor authorities.

**Harbor works** were under way in 1917. A large harbor and quay had been built exclusively for the coal trade, and quays were being constructed.

**Floating dock.**—See Appendix I.

**Storm signals** are shown from the mast of the floating pier, where information on the weather is obtainable. See page 33.

**Trade.**—Several sawmills are in operation, and extensive wool washeries on Karantinni Island, Kherson being the most important town in Russia for merino wool.

Timber and grain are the principal exports.

**Supplies.**—Provisions are obtainable; coal, anthracite and steam, are also obtainable. Water is taken from the river, and should be boiled before drinking.

**Communication.**—Steamers run daily in spring and summer, and three times a week in autumn, between Kherson and Nikolaev; also up the Dnieper as far as Aleksandrovsk, from which place there is communication by rail with Sevastopol, Moscow, and Petrograd. Steamers also run to Odessa.

A railway connects Kherson with Nikolaev, and a line to Jankoi junction, for Sevastopol and Kertch, under construction.

Kherson is connected with the Russian telegraph system, and has telephonic communication with Nikolaev and Odessa.

**Hospitals.**—There is a military hospital and also a town hospital. Foreign vessels arriving in Kherson Bay from infected ports undergo quarantine at Ochakov.

The climate at Kherson is healthy.

**BUG RIVER.**—The entrance to the Bug River, which forms the waterway to the important town of Nikolaev, lies between Adzhigiol and Bublikov Points, which bear east and west from each other, distant 11 miles. The river is from 1 to 3 miles wide, with a tortuous course, the shores and points being bordered with sand flats, especially on its eastern side, where in some places they extend out beyond the middle of the stream.

The western bank of the river is almost everywhere clay, steep and high. The eastern bank, on the contrary, consists of gently undulating hills and of low tongues of sand.

The channel follows generally the western bank of the river, except to the southward of Volosh and Russian Spits, where it is in midriver, and near Fort Konstantin, 2 miles south of Nikolaev, where it lies near the eastern bank.

The river is navigable for small vessels as far as Vosnesensk, about 40 miles above Nikolaev.

**Ice.**—The Bug is covered with ice at the same time as in the Dnieper estuary, that is, from the beginning of December to the middle of March. See also page 60.

**Depths—Dredged channel.**—The depths in the river are variable, but a channel 150 feet wide, with a least depth of 30 feet

(9.1 m.), was dredged in 1916 as far as the bridge over the Ingul River, on the north side of Nikolaev.

This depth, however, owing to the absence of the necessary dredging during the war, has (1921) decreased to about 26 feet (7.9 m.).

The channel above the Ingul River to Vosnesensk has been dredged to a depth of 10 feet (3 m.).

Vessels passing dredgers must reduce speed in good time in order to avoid causing damage. See Dredgers, page 253.

**Depth signals.**—Three miles to the northward of Sakena Point, on the western side of the river entrance, is the village of Ilinskoe, a little southward of which is a round yellow tower surmounting an octagonal building, with a signal mast close to it from which signals are made to indicate the depth in the channel. See page 241.

Vessels can communicate with the Parutino signal stations by International Code, and messages will be transmitted by telegraph to their destinations.

**Range beacons.**—On the west side of the entrance to the Bug River (*46° 38½′ N., 31° 55′ E.*), near the shore between Sari Kamishi and Sakena Point, is Sari Kamishi Beacon, a black beacon with square top mark, 49 feet (14.9 m.) in height, which forms a useful mark, the coast here presenting no conspicuous features.

A beacon painted black, 44 feet (13.4 m.) in height and elevated 179 feet (54.6 m.), formed by a mast with supports and surrounded by a triangular top mark, apex up, has been erected 800 feet 326° from Sari Kamishi Beacon.

These beacons when in range, bearing 326°, indicate the junction of the third and fourth reaches of the Ochakov-Bug dredged channel.

**Sakena (Sarikalsk) Point—Range beacons.**—Two beacons of similar construction to the above have been erected on the southern slope of the ravine northward of this point. The triangular top mark of the front beacon has the apex downward.

These beacons are 875 feet apart and each 44 feet (13.4 m.) in height, the front beacon being elevated 88 feet (26.8 m.) and the rear 92 feet (28 m.).

When in range, bearing about 290°, they indicate the junction of the fourth and fifth reaches of the above dredged channel.

These beacons were not seen in 1919.

**Buoys.**—The dredged channel from Adzhigiol Spit to Volosh Spit is marked on the starboard side by black spar buoys with cone top marks and on the port side by red spar buoys with inverted cones. A red light buoy showing a group occulting red light is moored on the north side of the junction between the third and fourth reaches of the Ochakov Channel. The salient points of the shore bank extending from the eastern and northern shores of the river between Svyatotroitski Spit and Ingul River are marked by black conical or black spar buoys. The dredged channel from Didova Khata to Vavarovka and into Ingul River is marked on the starboard hand by black spar buoys surmounted by flags and on the port hand by red spar buoys surmounted by flags.

The channel leading to Varvarovka Pier is marked by one red spar buoy and two white spar buoys.

The buoys are not to be depended on.

All the buoys in the Bug River are placed in not less than 18 feet (5.5 m.) water.

**Lights.**—The lights in the approach to the Bug River have already been described. Those in the river are as follows:

**Khablova Point Range Lights.**—The front light, fixed red, 80 feet (24.4 m.) above the sea, is shown from a white square iron tower 16 feet (4.9 m.) in height situated on the eastern bank at Khablova. A stone dwelling, the side of which facing the range line is painted black, stands close behind this lighthouse. A white wooden shield 21 feet (6.4 m.) in height has been erected on the slope of the point, and from the river appears to be a continuation of this lighthouse.

The rear light, fixed white, 133 feet (40.5 m.) above the sea, is shown from a dark-colored stone tower with black lantern, 47 feet (14.3 m.) in height, situated 1.3 miles 64° from the front light. A stone dwelling stands north of the lighthouse.

These lights in range, 64°, lead through the third reach of Ochakov-Bug dredged channel.

**Lupareva Light** (*46° 41′ N., 31° 59′ E.*), fixed white, is shown from a white tower with red roof, 18 feet (5.5 m.) in height, adjoining a house with red roof situated south of the village.

**Kislyakovka Light,** fixed white, 195 feet (59.4 m.) above the sea, visible 20 miles, is shown from a white tower with red roof near a house 46 feet (14 m.) in height.

This light in range with Lupareva Light, bearing 41°, leads through the fourth reach of the dredged channel.

**Svyatotroitski Light,** fixed white, 55 feet (16.8 m.) above the sea, visible 12 miles, is shown from a cylindrical iron tower painted white, 60 feet (18.3 m.) in height situated at Svyatotroitski.

The western limit of this light leads clear of the dangers off Sakena Point and Volosh Spit. The eastern limit clears the bank off Semenov Point.

**Ozharsk Spit Light,** fixed white, 124 feet (37.8 m.) above the sea, visible 15 miles, is shown from a red cylindrical iron tower 128 feet (39 m.) in height, situated on the east bank of the river ¾ mile southeastward from Ozharskaya Kosa (Ozharsk Spit).

This light in range with Svyatotroitski Light, 3°, leads through the fifth reach of Ochakov Channel.

**Lower Volosh Light,** alternating red and white, 21 feet (6.4 m.) above the sea, is shown from a red iron hut on piles 23 feet (7 m.) in height, situated near the extremity of Volosh Spit (Voloshskaya Kosa).

**Fog signal.**—A fog signal is made on a bell.

**Depth signals.**—A mast near the light structure repeats the depth of water in the dredged channel. See page 241.

**Upper Volosh Light** (*46° 44′ N., 31° 53′ E.*), fixed white, 130 feet (39.6 m.) above the sea, is shown from a white house, 15 feet (4.6 m.) in height. A low-powered auxiliary light, fixed red, is shown 3 feet (0.9 m.) above the main light from the same house.

**Siversov Range Lights.**—The front light, fixed red, 44 feet (13.4 m.) above the sea, is shown from an iron framework with central tube situated on the east bank of the river on Siversov Point. The old lighthouse, 49 feet (14.9 m.) in height, is still standing west of the new one.

The rear light, fixed white, 187 feet (57 m.) above the sea, is shown from a white stone house, 23 feet (7 m.) in height, situated 2,840 yards 43° from the front light.

**Fog signal.**—A fog signal is made on a bell at the front light.

**Light.**—Two fixed white lights, vertical, 35 feet (10.7 m.) above the sea, are shown from a white mast 17 feet (5.2 m.) in height situated 1.2 miles north of Siversov rear range light.

**A beacon** 17 feet (5.2 m.) in height, consisting of a mast with two white flags, is erected on the shore 1,000 yards west of Siversov rear range light and abreast of a sunken wreck lying in mid-river westward of the range line. Lights are exhibited from this beacon.

**Bogoyavlensk** is a large village or town situated southward of Siversov Lights, with two churches and a group of windmills.

**Fort Konstantin** (*46° 55½′ N., 32° 01′ E.*).—About 2 miles northward of Siversov front lighthouse is Fort Konstantin, situated on the extensive bank which here fronts the western shore of the river. Eastward of the fort is a groin or dyke extending toward the eastern shore and narrowing the navigable channel between it and the eastern shore to about 200 yards in breadth.

**Buoy.**—A red spar buoy is moored off the eastern extremity of the groin.

**Konstantin Light,** fixed white, 11 feet (3.4 m.) above the sea, is shown from a white iron tower on piles, 36 feet (11 m.) in height, situated on the east bank of the river abreast Fort Konstantin and just southward of the end of the pier.

An additional white light of less power, 9 feet (2.7 m.) above the sea, is shown from a sentry box at the base of the lighthouse to assist in determining the distance from the pier when passing.

**Fog signal.**—A fog signal is made on a bell.

**Konstantin Range Lights.**—The front light, fixed green, 50 feet (15.2 m.) above the sea, is shown from a red pyramidal framework beacon with fan-shaped top mark situated about 580 yards northward of Konstantin Light.

The rear light, 101 feet (30.8 m.) above the sea, is shown from a similar beacon 24 feet (7.3 m.) in height situated 320 yards 22° from the front light.

These lights in range, 22°, lead through the channel and westward of a sunken wreck which is marked by a light.

**Light buoy.**—A light buoy showing a red light is moored 300 yards west-southwestward from Konstantin Light.

**Shirokoi Pier,** just within Konstantin Lighthouse, has a depth of 22 feet (6.7 m.) at its extremity.

**Nikolaev Harbor lights.**—A fixed red light, 38 feet (11.6 m.) above the sea, visible 4 miles, is shown from a white iron tower 32 feet (9.8 m.) in height situated on the head of Cabotage Harbor mole.

The elevators in the port and their approaches are lighted with electric lights.

**Didova Khata Light** (*46° 55′ N., 31° 57′ E.*).—A fixed white light, 37 feet (11.3 m.) above the sea, is shown from a white wooden tower 42 feet (12.8 m.) in height situated at Didova Khata, opposite Lyeskov Spit.

**Light buoy.**—A black pyramidal-shaped beacon buoy, showing a fixed red light, is moored in a depth of 32 feet (9.8 m.) off the southern extremity of Lyeskov Spit and nearly opposite Didova Khata Lighthouse.

**Coast.**—Bolshaya Korenikha (Nikolaevka) village is situated in the bight of the bay northwestward of Didova Khata Lighthouse. From it the coast trends northeastward to Varvarovka village, opposite the mouth of the Ingul, beyond which the river takes a very sharp trend to the westward and northwestward.

From the point of the peninsula thus formed the shore flat, with depths under 3 fathoms (5.5 m.), extends three-quarters of the distance across the river, southward of which is the anchorage for adjustment of compasses, referred to on page 254.

**Pier.**—The depth in the channel leading to Vavarovka Pier is 25 feet (7.6 m.) over a breadth of 350 feet.

**Spasskaya Kosa (Spassk Spit)** extends from the eastern shore, with a depth under 6 feet (1.8 m.), nearly halfway across the river to the coast between Bolshaya Korenikha and Varvarovka; its extremity is marked by a black conical buoy and a spar buoy with flag.

**Directions.**—A conspicuous mill at Varvarovka in range with the wall of the Jewish cemetery, bearing 14°, leads westward of the spit.

**Spassk Range Lights.**—The front light, fixed red, 10 feet (3 m.) above the sea, is shown from a wooden framework at Spassk Pier, the landing place for naval vessels, northeast of Spasskaya Kosa.

The rear light, fixed white, 16 feet (4.9 m.) above the sea, is shown from an iron lamp-post 50 yards 61° from the front light.

These lights in range, bearing 61°, lead close to the edge of the bank extending from the shore northward of Spasskaya Kosa.

**Spassk Roadstead,** abreast the military pier, is used as the anchorage for vessels of war; it has depths of 24 to 25 feet (7.3 to 7.6 m.), over a mud bottom.

**Piers.**—At Spasskoe (Spassk) (*46° 58′ N., 31° 58′ E.*), just below the bridge of boats, are two piers, the northern belonging to the Russian Steam Navigation Co. and the other to the arsenal, which latter is used by the boats of naval vessels.

**The channel leading to Ingul River** from westward of Lyeskov Spit black buoy, which was dredged in 1916 to a depth of 30 feet (9.1 m.) with a width of 350 feet, now silted to about 28 feet (8.5 m.), is marked by black spar buoys on the starboard hand and red spar buoys on the port hand, surmounted by flags of same colors, except at its northern end.

There is a dredged channel of 25 feet (7.6 m.) to Varvarovka Pier from the above channel.

**Bridge of boats.**—A bridge of boats, ½ mile in length, connects Spasskoe with the village of Varvarovka on the western bank of the river. It is opened for the passage of vessels at 5 p. m. on Mondays and Fridays (market days at Nikolaev) and at 9 a. m. and 5 p. m. on other days of the week.

**Telegraph cables—Range lights.**—The shore ends of the two telegraph cables on Powder Magazine Point, at the junction of the Bug and Ingul Rivers, are each marked by a pair of black and yellow beacons with disk top marks. A red light is exhibited from each of the front lights and a yellow light from each of the rear beacons. Anchorage on or between the line of these beacons is prohibited.

**Buoys.**—The telegraph cables between Powder Magazine Point and Varvarovka village are also marked by a number of black and yellow checkered spar buoys.

**Dredgers.**—On board the dredgers when at work in any part of the channel the following not under control signals will be made:

At the foremast by day three black balls 3 feet apart, and by night three red lights.

In order to indicate on which side vessels should pass, one long whistle and the waving of a white flag by day and a white light at night on the corresponding side. Vessels are to proceed at slow speed when passing a dredger.

The dredgers will haul out of the channel to allow vessels to pass them when necessary. During fogs they haul to the right side of the channel, and if possible beyond it.

**Measured distance.**—A distance of 12,152 feet, or nearly 2 miles, is marked by white columns or poles with supports erected on the western shore between Bogdanovka and Novaya Bogdanovka, as charted, the running line being that of the Siversov Lighthouses, 43°.

**Life-saving stations.**—There are life-saving stations at Konstantin Lighthouse, Malaya Korenikha, and Nikolaev. The first and last-mentioned stations are each equipped with a lifeboat on runners.

**Beacons for adjusting compasses** (*47° 02′ N., 31° 59′ E.*).—About 2½ miles to the northward of Powder Magazine Point, is a white wooden pyramidal beacon with staff and cone, and 800 yards northward of it are five white stone beacons side by side. The alignment of the front beacon with one of the rear beacons enables vessels in the anchorage northward of the entrance to the Ingul to ascertain the deviation of their compasses.

The true bearings of these alignments are, respectively, 347° 57′, 347° 12′, 346° 27′, 345° 42′, and 344° 57′.

**Directions for Bug River.**—All vessels navigating the Bug River or the Dnieper are governed by the International regulations for preventing collisions at sea in addition to local regulations, of which the pilots are fully acquainted. Vessels under 15½ feet draft should give way in good time to those of greater draft so as not to interfere with the continuous traffic of deep-draft vessels along the fairway. See also Regulations, on page 241.

**By day.**—From the Adzhigiol light buoys steer between the spar buoys marking the dredged channel, with the Khablova beacons in range, 64°, until Kislyakovka and Lupareva Lighthouses are in range, 41°. Keep on this range until Ozharsk Lighthouse is in range with Svyatotroitski Lighthouse, 4°, which leads up to Volosh Spit. Pass between the buoys marking the shoals off this spit and Russian Spit (Russkaya Kosa), and then follow the curve of the west bank at ½ mile, leaving the black buoys and beacons to starboard. When abreast of Siversov Lighthouse follow the east bank of the river, passing between the red light buoy off Fort Konstantin and the lighthouse, thence along the same shore up to the quays at Nikolaev.

**By night.**—From the Adzhigiol light buoys steer 64° to pass southward of the light buoy off Sari Kamishi, which marks the junction between the third and fourth reaches of the Ochakov Channel. From thence steer with Kislyakovka and Lupareva Lights in range, 41°, until Ozharsk Light is in range with Svyatotroitski Light, 4°, which will lead through the last reach of the dredged channel and up to abreast of Volosh Spit, when Upper Volosh Light will be seen. Steer for this light on 287° until Lower Volosh Light opens, bearing 146°, when course should be altered to bring it astern on that bearing, keeping within its arc of visibility until the northern sector of light from Upper Volosh Lighthouse comes into view, when keep within the limits of this latter sector at a sufficient distance from the west bank, bearing about 177°, astern, observing that the eastern limit of this light passes very near the flats off Ozharsk Spit; edge toward the eastern limit of this sector when northward of the black buoy westward of the spit until the Siversov lights appear, which in range, bearing 43°, will lead close up to Siversov Spit. The east bank should now be followed, passing between the light buoy off Fort Konstantin and the light near Shirokoi Pier abreast it, with the Konstantin Range Lights in line, bearing 16°, which also leads eastward of a wreck situated ½ mile southward of Fort Konstantin, until northward of the light buoy; thence steer for the anchorage southward of the town. Pilotage is compulsory, as before stated.

**NIKOLAEV** (*46° 58′ N., 31° 59′ E.*).—The town of Nikolaev is situated 28 miles above Adzhigiol Point, on the eastern part of a peninsula formed by the Bug River and its tributary, the Ingul, which latter, often following a shallow and sinuous course, flows into the Bug along the northern shore of the town. The western part of the peninsula is formed by sand hills covered with vegetation, and on its northwestern shore are several country houses surrounded by trees.

The southern and western sides of the peninsula are bordered by a shallow bank which, southward and westward of Lyeskov Spit, extends 1,400 yards from the shore.

**Aspect.**—**Prominent objects** are the building of the Nikolaev Astronomical Observatory, on an elevation in the western part of the town, a large yellow building with cupola and a mast for the time signal, the ball for which is at an elevation of 197 feet (60 m.) above the sea and 59 feet (18 m.) above the ground. The signal station, with a mast and yard just eastward of it, is also conspicuous. Other objects become visible as the town is approached. Vessels will be seen in the port, and over them an enormous elevator, with numerous warehouses and granaries at the sea level.

**Limits of the port.**—The limit of Nikolaev commercial port, beginning on the left bank of the southern Bug near the western edge of the site of the Black Sea Mechanical Works, passes along the water's edge to the eastward as far as the limits of the Government's port territory of the harbor for coasters at Popovaya Balka, including in this extent the piers of the Black Sea Mechanical Works, the Naphtha (petroleum), and Shipbuilding and Engineering Works. Thence the limit of the port embraces the Government territory of the coaster's harbor, and follows the bank of Bug River, taking in a 70-foot shore space as far as the extremity of Cape Stanislav. Thence it passes in a direct line across the Bug to the extremity of Adzhigiol Point, and northward along the right bank of the Bug, including 70 feet of the shore space as far as the extremity of the point near the village of Malaya Korenikha, whence, cutting across the Bug in a straight line, it again joins the beginning of the limits at the western end of the site of the Black Sea Mechanical Works.

**Commercial port.**—The commercial port of Nikolaev consists of two contiguous sections, the foreign and the coasting trade sections.

**Coasters' harbor.**—A harbor for coasters (Cabotage Harbor) has been formed by the building of a curved mole. The depth on the harbor side is 23 feet (7 m.), and outside, on its western side, 22 feet (6.7 m.). The breadth of the mole is from 220 to 280 feet, and there is a light on its extremity.

Two beacons surmounted by diamond-shaped red and white top marks are erected on the coasters' mole, which in range, bearing 314°, lead through the dredged channel to the western side of the mole with a depth of 25 feet (7.6 m.) until near the quays.

**Beacons.**—Two beacons are erected in the commercial port. The front beacon is situated about 513 yards 20° from the light on the coasters' harbor molehead; the rear at 73 yards 350° from the front beacon. They are 52 feet (15.8 m.) high and surmounted by framework triangles.

**Depths.**—In the area eastward of the range line of the beacons is not less than 25 feet (7.6 m.) depth, and is mostly dredged a depth of 28 feet (8.3 m.).

**Naval port.**—The naval yard and the arsenal are situated on the northern side of the town on the banks of the Ingul River, which is here crossed by a bridge, the ends of which are carried on piles and the center on boats. This bridge can be opened for the passage of vessels. The Government yard is leased to private shipbuilding companies.

**The channel** leading from the Bug into the Ingul and up to the naval port was dredged in 1916 to a depth of 30 feet (9.1 m.), but has since silted to about 28 feet (8.5 m.), and is marked in the usual way.

**Storm signals** are made from a flagstaff on the quay of the foreign section. See page 33.

**Ice breakers** are stationed at Nikolaev for use in the Bug River and Kherson Bay.

**Swinging buoys.**—A mooring buoy is situated in the anchorage on the central alignment 1.3 miles 166° from the front beacon. Around this buoy are several others, which permits of vessels being swung on eight equidistant points.

The depth within the circle is from 17 to 18 feet (5.2 to 5.5 m.).

**Pilots.**—There is a pilot station on the quay of the foreign section. See also page 236.

**Signal station.**—The signal station, mentioned on page 255, is a round stone tower with octagonal base, painted yellow, 92 feet (28 m.) in height, surmounted by a signal mast, and stands close eastward of the observatory.

**THE TOWN OF NIKOLAEV**, with a population in 1913 of 106,279, covers a large extent of ground, with wide streets which cross one another at right angles. The two principal, Khersonskaya Street and Sadovaya Street, divide the town into four quarters, of which the western quarters are the best built. An interesting feature of Nikolaev is the Greigovski Boulevard, which extends from the palace to the cathedral along the elevated bank of the Ingul.

**Port regulations.**—Masters of vessels visiting the port should obtain a copy of the port regulations from the port authorities.

**Town quay**, eastward of the foreign section, with a depth of 30 feet (9.1 m.) alongside, has a length of 1,925 feet, and is also intended for foreign vessels.

**Karpas and Kogan Pier** is situated westward of the coasters' harbor for vessels loading ore. It is 287 feet in length, 43 feet wide, with a depth of 25 feet (7.6 m.). It is fitted with four transporters.

**Volunteer Fleet Pier** lies between the Karpas and Kogan Pier and the mole of the coasters' harbor. It is a wooden pier 280 feet long, with a width of 140 feet, and fitted with bollards and rings for berthing craft.

**In the coasters' harbor** there are 3,332 feet of quayage alongside the mole, which is fitted with mooring rings 70 feet apart along its sides, with bollards on top in convenient places.

In the western part of the coasters' harbor is the Office of Works Pier on piles, for berthing the dredgers. It is 420 feet long and 21 feet wide.

**The Petroleum Pier**, situated 500 yards westward of the coasters' harbor mole, extends 735 feet from the shore; is is built on piles, along which are laid pipes for pumping the oil directly from the steamers into the tanks of the petroleum station.

**Shipbuilding plant.**—Near the coasters' section of the port, between the petroleum station and the coasters' mole, are the shipbuilding and foundries of the Nikolaev Shipbuilding & Engineering Co., with a slip for building large vessels.

**Berthing—Foreign vessels.**—In the eastern or foreign section is a Government quay having a length of 3,850 feet, with ringbolts in the walls at intervals of 70 feet and bollards in convenient places on the quay, and a depth alongside of 28 feet (8.5 m.). Fourteen steam vessels can lie at this and the three adjacent quays, of an average length of 350 feet.

Westward of the Government quay are the three quays of the Petrograd International Lading Co., 231 feet, 392 feet, and 350 feet in length, respectively, and equipped with light railways and transporters for loading ore.

This company has another pier at a distance of 1,200 yards eastward of the foreign section. It has a length of 2,100 feet and a depth alongside of 30 feet (9.1 m.). This quay is a continuation of the town quay in a southerly direction.

**Loading facilities.**—In the western section of the port there is a grain elevator with a capacity of 14.000.000 bushels, the property of the Southern Railway Co. It is adapted to pass grain simultaneously into three steamers lying alongside the quay. In addition to this elevator are seven floating elevators.

For loading iron ore there are 28 transporters of various systems. There are also floating sheers with a lifting power of 25 tons, and several cranes of 1½ to 3 tons capacity.

In the foreign section there are four warehouses, three of which belong to the Southern Railway and the fourth to the customs.

On the mole of the coasters' harbor there are about 11 storehouses belonging to various companies, and four coal sheds along the shore of the harbor. The railway runs on to the coasters' mole, and another branch to the foreign section of the port.

The whole of the port is illuminated by electric arc lanterns.

**Repairs.**—The workshops in the naval yard have all the necessary appliances for the construction and repair of large vessels.

**Floating dock.**—See Appendix I.

**Coal and supplies.**—About 60,000 tons are imported; 6,000 tons of Donetz coal is usually in stock. Vessels coal alongside the quay, which has a depth of 25 feet (7.6 m.) alongside. From 600 to 1.000 tons can be put on board per day. Previous notice must be given if a large quantity is required.

There are some lighters for coaling in the road.

Supplies of all kinds could be obtained at reasonable prices; vegetables scarce. Water which is good for drinking is delivered by pipe to vessels alongside the quay.

**Trade.**—Exports from Nikolaev consist of large quantities of grain and iron ore. Manganese and timber are also exported.

The coasting trade is insignificant.

**Communication.**—Steamers run daily to Odessa (eight hours). Steamers also run daily, Saturdays excepted, to Kherson and Vosnesensk. There is constant steamer communication between Nikolaev and Ochakov.

Nikolaev is connected with the whole railroad system of Russia.

Communication by telegraph with all parts, and by telephone with Kherson and Odessa.

**Radio.**—Station RHH, range 1,800 miles, wave length 3,500 meters. Station RHL, range 250 miles, wave length 600 meters.

**Time ball.**—From the observatory, situated westward of the town on the highest point of the peninsula, 197 feet (60.0 m.) above the river, a black ball is dropped at noon, standard time, which corresponds to 10ʰ· 00ᵐ· 00ˢ· Greenwich civil time. A gun is fired at the same time.

The ball is hoisted close up at five minutes before signal. If signal fails the ball, after an interval of one minute, is lowered very slowly. (Temporarily discontinued, 1925.)

**Weather and ice information.**—Information concerning the weather, depths in channels, and in winter the state of the ice in the estuary, will be displayed daily on the quay in the foreign section and on the pier at Spasskoe above Nikolaev. For Meteorological table see Appendix III.

**Health.**—There are no climatic diseases, but during the hot season river fish and raw fruits should be avoided as liable to produce diarrhea and cholerine.

**Hospitals.**—There is a naval and a town hospital affording excellent accommodations for seamen of all nationalities.

**Quarantine.**—The health and customs officials board vessels at Ochakov.

The customs officials seal the hatches. Care should be taken to see that everything is declared and the seals are kept intact, as there is a fine for each seal broken.

**Egorlitski (Kinburn) Gulf.**—The coast from Kinburn Point (p. 237) continues low and sandy to the southeast for about 11 miles. It then bends in to the eastward, forming the spacious Egorlitski Gulf, which affords plenty of room for small vessels in depths varying from 12 to 20 feet (3.7 to 6.1 m.), over a bottom of mud and sand, and sheltered from all but westerly winds.

Southeastward of the northern entrance point of the bay are two low islands, known as Krugli and Dolgi. The former is small in extent; the latter is 4 miles long and ½ mile wide. Both lie on the shallow flat fronting the shore within the 3-fathom (5.5 m.) curve.

The entrance into the bay is about 2½ miles in breadth between Dolgi Island and its southern shore, but the channel, with depths of 12 to 15 feet (3.7 to 4.6 m.), is only 1 mile wide.

The shores of the bay are generally low, the northern consisting of sand hills, some of which are wooded. The northern shore is inhabited, the village of Pokrovka covering a considerable extent of ground among the sand hills at the northwest end. Fresh water can be obtained at Pokrovka or from wells at the head of the bay. The water obtained from the wells on the southern shore is brackish.

Weed is very abundant and forms a great hindrance to steam navigation, owing to its fouling the propellers. Large boats can not in most places approach the shores of the bay, owing to the very shallow water.

**Anchorage.**—The usual anchorage is about 2 miles eastward of Dolgi Island in from 2 to 3 fathoms (3.7 to 5.5 m.). Northwesterly winds force the water into the gulf, causing a current which sets round the bay and keeps vessels tide-rode.

**Tendra Peninsula (Tendrovskaya Kosa).**—The long sandy plain which terminates to the westward in the Kinburn and Egorlitski Peninsulas is bordered to the southward by Tendra Peninsula, a long strip of sand about 35 miles in length and at its northern extremity about 1 mile in breadth, but as it trends to the eastward it gradually narrows to less than ¼ mile. Two narrow channels or breaks, named Vassalskaya and Kazen, of about 200 yards in breadth, are in its eastern portion.

The lead should be kept constantly going in approaching the peninsula.

**Tendra Peninsula Light** (*46° 19′ N., 31° 31′ E.*), flashing white, 96 feet (29.3 m.) above the sea, is shown from a white circular tower with two black bands, 99 feet (30.2 m.) in height, situated about 2.8 miles southward of Tendra Point.

**Fog signal.**—A fog signal is made on a bell at the lighthouse.

**Signal station.**—The lighthouse is connected by telephone with the village of Chernamorskaya Kolod. Telegrams will be received from vessels by International Code and forwarded to their destinations. (Temporarily discontinued.)

**Landmark.**—There is a conspicuous clump of trees on the coast about 1½ miles to the northward of the lighthouse.

**Caution.**—Wrecks more or less visible frequently exist in the southern approach to Tendra Lighthouse, which, not being always buoyed, form a danger to navigation.

**Tendra Point (occasional) Light,** alternating flashing white and red, 45 feet (13.7 m.) above the sea, white light visible 7 miles, red light 6 miles, is shown from a yellow wooden hut on piles, 47 feet (14.3 m.) in height, situated near the northern extremity of Tendra Peninsula.

**Beacons.**—The land of the peninsula being very low, and not visible sometimes even in fine weather at a distance of more than 3 or 4 miles, three beacons have been erected on it, each about 60 feet (18.3 m.) in height. The first stands 4⅓ miles southeastward from the lighthouse and consists of a mast with eight supports, with spherical top mark, 65 feet (19.8 m.) above the sea. The second stands about 4 miles southeast from the first and has a top mark consisting of two vertical and two diagonal laths (V-shaped), 58 feet (17.7 m.) above the sea; and the third, about 17 miles eastward of the second, between Vassalskaya and Kazen Ferries, is an iron mast with stays surmounted by an iron lattice square, 65 feet (19.8 m.) above the sea.

**Tendra Bay.**—There is good anchorage in Tendra Bay to the eastward of the lighthouse in 6 to 7 fathoms (11 to 12.8 m.), 2½ miles from the shore, well sheltered from the south and west as far round as northwest or more northward, depending on the position taken up; but the greater portion is open to the north-northwest. The space formed to the eastward between the eastern part of the peninsula and the mainland is known as Tendra Gulf and is very shallow, having only a depth of from 2 to 10 feet (0.6 to 3 m.) in it.

**Wrecks.**—An old battleship, the *Chesma*, sunk for the use of the Russian fleet (1913), with upper works showing above water, is situated at a distance of 4½ miles, 107°, from Tendra Peninsula Lighthouse. There are other wrecks in the bay. (See chart.)

**Ice.**—During hard frosts in winter the bay is covered with ice, but is broken up when the wind is fresh.

**Anchorage.**—Should a vessel when bound to Odessa meet with strong northerly winds, she may anchor to the southward of the peninsula in any convenient depth, as the shore is clean. There are from 27 to 32 feet (8.2 to 9.6 m.) 1½ to 3½ miles from it, and from 7 to 9 fathoms (12.8 to 16.5 m.) 1½ to 2 miles to the westward of the lighthouse, over a bottom of sand and shells.

**Caution.**—The lowness of the Tendra Peninsula renders it very dangerous, especially as the current, which usually sets to the eastward, is very variable in strength. This current is strongest with westerly winds, and vessels bound from the southward to Odessa, after ascertaining their position off Fidonisi (Serpent Island), often sight Tendra Lighthouse when expecting to make Odessa. In foggy weather, therefore, when in this vicinity the lead should be kept constantly going and great attention paid to the soundings.

**Water** is obtainable from the well at Tendra Lighthouse and at the various fishing huts along the spit.

Occasionally poultry is obtainable at a farm.

From August to October is the fishing season, the chief fish caught being mackerel and flounders. Flocks of sheep are pastured here in the winter.

**GULF OF KARKINITSKI.**—This large bay, between Dzharilgatskoi Spit and the northwest shores of the Krimea, is about 40 miles wide at its entrance, with depths of about 15 fathoms (4.6 m.) in its approach.

**Water level.**—Northeasterly winds lower the level of the water in the bay and southwest winds raise it. In autumn, when east and northeast winds prevail, the lowering of the level of the water in the gulf and adjacent bays is as much as 2 or 3 feet (0.6 or 0.9 m.).

**Wreck.**—A sunken wreck lies about 15.6 miles 179° from Tendra Peninsula Light.

**Dzharilgatski Bay.**—The coast to the eastward of Tendra Peninsula continues low, with some high buildings on it, and runs in an easterly direction for 14 miles; thence Dzharilgatskoi Spit, a long strip of narrow land, extends in the same direction for 22 miles to Dzharilgatski Point, forming with the mainland a deep bay, the outer part of which affords good anchorage for vessels of a moderate draft seeking shelter from west or southwest winds. The greater portion of the bay has depths of less than 1 fathom (1.8 m.). The western end of the spit, near which there is a narrow channel and a ferry about 1½ miles to the southward of Sofievka village, is not more than 200 yards across, but 10 miles farther eastward it widens and for the remainder of its extent, which is known as Dzharilgatski Island, it is from 1 to 2½ miles wide.

**A 3-fathom patch** is situated about 2¼ miles to the southward of Dzharilgatski Point, and a shoal with only 6 feet (1.8 m.) of water extends 1 mile to the northeastward of this point and of the coast westward of it; the point should therefore be rounded with caution.

**Directions.**—The western white sector of Dzharilgatski Point Light leads westward of the 3-fathom (5.5 m.) patch.

**Dzharilgatski Point Light** (*46° 01′ N., 33° 04′ E.*), fixed white with red sectors, 80 feet (24.4 m.) above the sea, visible 14 miles, is shown from a white iron framework with a central tower, 86 feet (26.2 m.) in height, situated on Dzharilgatski Point.

**Fog signal.**—A fog signal is made on a bell.

**Beacon.**—A beacon 65 feet (19.8 m.) high, consisting of a mast with supports surmounted by a barrel, stands on Dzharilgatskoi Spit about 11½ miles to the westward of the lighthouse.

**Landmarks.**—A conspicuous shed surmounted by a post with rectangular top mark stands on Dzharilgatski Island at about 5.1 miles eastward of the above beacon.

The village of Krasnoe, which is rendered conspicuous by the cupola of its white church, and the church of the village of Skadovsk, eastward of Krasnoe, are seen from seaward over Dzharilgatskoi Spit.

**Buoys.**—The shoal around Dzharilgatski Point is marked by three red spar buoys with inverted cone top marks and by a red conical buoy northeastward of the point. Within Dzharilgatski Bay the edge of the shore bank is marked in 4 fathoms (7.3 m.) by two black spar buoys with upright cones on the northern side and by two red spar buoys with inverted cones on the southern side.

**Anchorage.**—A vessel in rounding Dzharilgatski Point must be careful to avoid the shoal which extends from it fully a mile to the northeastward, and is the beginning of a flat carrying a depth of 1 to 3 fathoms (0.9 to 5.5 m.) which encircles the whole shores of the bay. The best anchorage is in the middle of the entrance in 4½ to 5 fathoms (8.2 to 9.1 m.) over a muddy bottom, about 3 miles to the northward of the lighthouse.

Weed is abundant in the bay during summer and autumn and forms a hindrance to navigation. In places it reaches the surface and fouls the screws.

**Ice.**—In the winer Dzharilgatski Bay freezes so hard that it is possible to cross it at Krasnoe with heavy loads.

**Pilotage** is compulsory in the Gulf of Karkinitski. A pilot will be sent to meet a vessel off the lighthouse if a telegram is sent before hand to Skadovsk, his permanent residence.

All vessels proceeding to any of the anchorages in Karkinitski Bay are obliged to call at Skadovsk for pratique and customs examination, except when the pilot meets a vessel off the lighthouse. In that case the quarantine and customs officers will accompany him, so as to enable a vessel to proceed to her proper destination without first going to Skadovsk.

**Channel to Skadovsk.**—The channel to Skadovsk is 1 mile long and 140 feet wide, with a depth in 1924 of 9 feet (2.7 m.).

**Range lights.**—The front light, fixed red, 29 feet (8.8 m.) above the sea, is shown from a white mast with triangle, 26 feet (7.9 m.) in height, situated on the south shore near the village of Skadovsk.

The rear light, fixed white, 32 feet (9.8 m.) above the sea, is shown from a white mast with diamond, 24 feet (7.3 m.) in height, situated 245 yards 12° from the front light.

These lights in range lead up to the basin.

**Buoys.**—The eastern edge of the channel is marked by black spar buoys and the western edge by red spar buoys.

**Anchorage.**—Good anchorage may be obtained southward of the church in 3¼ fathoms (5.9 m.) 1¼ miles offshore, or in 25 feet (7.6 m.) 2 miles offshore, cargo being brought off in barges.

**Storm signals** are shown from a mast in the port. See page 33.

**Pilots.**—A Government pilot resides at Skadovsk. Pilotage is compulsory. See page 262.

**SKADOVSK.**—The large village of Skadovsk is situated on the north shore of Dzharilgatski Bay about 9 miles to the northwestward of the lighthouse, and has a permanent population of a little over 4,000, increased during the summer for sea bathing by about 1,000. A church which forms a good landmark is situated in the village.

Westward of Skadovsk is the apparently large village of Krasnoe, while northeastward of Skadovsk is that of Karga.

**Wharves.**—A pier 1,400 feet in length extends from the shore opposite the village.

Vessels usually load in the basin, where vessels up to 400 feet in length can be berthed, and which has a depth of 26 feet (7.9 m.) and quayage accommodation of 1,718 feet in length.

**Supplies.**—Water is obtainable from an artesian well; provisions in small quantities.

There is a marine railway and workshop for repairs.

**Communication.**—Steamers call here from Odessa weekly. There is a post and telegraph station.

**Hospital.**—There is a hospital at Skadovsk.

**PORT OF KHORLI** (*46° 05′ N., 33° 18′ E.*).—This port is situated on the northern shore of Karkinitski Bay, at the southern extremity of the peninsula of the same name. It is a port of considerable value, as neither the waters in the bay nor in the inner anchorage and channel to the port are impeded by ice. The anchorage westward of Kalanchak Spit and Churyum Spit is known as the outer anchorage, and that on the eastern side of these spits, within the outer dredged channel, as the inner anchorage. The latter has a depth of 24 feet (7.3 m.) and affords secure anchorage in all winds.

**Kalanchak Spit—Beacon.**—Northward of the inner end of the outer dredged channel an iron pole beacon with globe top mark, 20 feet (6.1 m.) high, has been erected in a depth of 5 feet (1.5 m.) to mark the end of the sunken spit extending southeastward of Kalanchak Island.

A light is occasionally shown from the beacon. (Beacon destroyed, 1924.)

**Churyum Spit—Buoys.**—Southward of the dredged channel is Churyum Spit, which extends about 7 miles southeastward from the above beacon, with depths of only a few feet over its southern portion. It is marked by a red spar buoy with inverted cone top mark on its western side in 4 fathoms (7.3 m.), and off its southern extremity by a similar buoy in 29 feet (8.8 m.).

The 3-fathom (5.5 m.) curve of the bank extending southward of Cape Dzhaldikhan is marked by a black spar buoy with cone top mark.

**Dredged channel.**—The outer dredged channel, 105 feet wide with a depth in 1924 of 19½ feet (5.9 m.), has been dredged from Karkinitski Bay in an easterly direction into the inner anchorage. The channel is about 2¼ miles in length and its western end is situated 5¾ miles 82° from Dzharilgatski Lighthouse.

**Buoys.**—It is marked on its northern side by red spar buoys and on its southern side by black spar buoys, those at the entrances having top marks, inverted cones on the northern side and upright cones on the southern side.

**Inner dredged channel to the basin.**—This channel has also a length of 2 miles, with a breadth of 105 feet and a depth in 1922 of 20 feet (6.1 m.) to the basin, and is marked by spar buoys without top marks and with range beacons, as described below.

**Range lights.**—The front light, fixed red, 41 feet (12.5 m.) above the sea, is shown from a red mast surmounted by a red latticework triangle, 36 feet (11 m.) in height, situated on the shore at Khorli.

The rear light, fixed white, 73 feet (22.3 m.) above the sea, is shown from a white mast surmounted by a white latticework disk, 49 feet (14.9 m.) in height, situated 273 yards 13° from the front light.

These lights in range, 13°, lead through the dredged channel from the inner anchorage to the port.

**Basins.**—The entrance to the basins is protected on the western side by a wooden quay with a dam projecting nearly 500 feet southward of it. One of the basins is 1,050 feet by 700 feet, with a depth in 1922 of 22 feet (6.7 m.); it has a pier 700 feet long and two shorter piers. The other basin, known as the new basin, has a depth of 9 to 10 feet (2.7 to 3 m.). There are grain warehouses with a capacity of 32,000 tons, a coal shed, and a petroleum depot. The grain is brought from the warehouses in carts to vessels lying at the quays. Loading from lighters is done by a floating elevator. The principal export is wheat.

**Storm signal station.**—Storm signals are hoisted from a white signal mast with a gaff a short distance to the westward of the line of the range beacons. See page 33.

**Pilots.**—Khorli is an official station for pilots.

**KHORLI.**—The town is laid out with broad streets and has a population of 2,000. The town and port are lighted by electricity.

There are several artesian wells and fresh water is plentiful. There is a market where provisions are obtainable in the morning.

**Repairs** may be executed in the new basin, ½ mile eastward of the harbor, where there are workshops and a marine railway for small vessels.

**Communication.**—There is a post and telegraph office at Khorli, and it is connected with Perekop by telephone.

**Hospital.**—There is a hospital in the town and a health officer is stationed here.

**Churyum.**—About 4 miles southeastward of Khorli is Churyum Pier, with a depth of 9 feet (2.7 m.) alongside. Grain is transported in barges from here and shipped at Khorli.

The village of Aleksyeevka or Churyum is about 2 miles inland from the pier.

**KARKINITSKI BAY,** unnamed on the Russian charts, is situated in the eastern part of the Gulf of Karkinitski; it is bordered, especially on its northern and eastern shores, by extensive shallow flats occupying fully half of the bay. Those extending southward of Khorli have been described. It terminates to the northeastward in Perekopski Bay, which has only a few feet of water. The southern shore for its whole length consists of a salt steppe; at the head of it, on the isthmus dividing it from the Sivash or Putrid Sea, is Perekop village.

Karknitski Bay affords secure anchorage in several places for all vessels that can cross the bar of about 4 fathoms (7.3 m.) between Dzharilgatski Lighthouse and the 3-fathom (9.1 m.) patch southward of it; southward of that patch the bar has depths of about 3¼ to 3½ fathoms (5.9 to 6.4 m.).

**Landmarks.**—The shores of Karkinitski Bay are low and flat, and in summer the recognition of the coast is rendered very difficult by mirage.

The best landmarks are Dzharilgatski Lighthouse; Khorli Point, the extremity of which is steep and yellowish in color; Bakal Spit beacon, described below; and the coast guard stations at Bakal and other places, which stand on slight elevations, consist of well-built stone houses, and are somewhat conspicuous.

**Mirage.**—In the eastern part of Karkinitski Bay during the summer mirage often makes the recognition of the shores a matter of no little difficulty. This mirage is caused by the dry, heated steppes bordering the bay, and the resulting uneven warming of the atmospheric layers above sea and land.

**Bakalskaya Kosa—Beacon.**—The southern shore of Karkinitski Bay trends in a general west-southwesterly direction as far as the coast guard station at Bakal, where it turns to the northward, forming Bakalskaya Kosa, the extremity of which, known as Kiln Murun Point, situated 13 miles south-southeastward from Dzharilgatski Lighthouse, is marked by a black pyramidal beacon 62 feet (18.9 m.) high surmounted by a ball.

**A narrow spit with 1¼ to 3 fathoms (2.3 to 5.5 m.)** extending 10 miles in a northerly direction from Kiln Murun, lies in the fairway of the approach to Karkinitski Bay. The northern extremity is marked by a black conical buoy in 24 feet (7.3 m.) of water; also by a black spar buoy with cone top mark. These buoys must not be relied on.

**Directions.**—The narrow white sector of Dzharilgatski Light leads over the charted position of the buoys.

The channel into the bay lies between this spit and Dzharilgatski Point, and is about 4¼ miles wide, with a maximum depth of 4 fathoms (7.3 m.).

**Tobiz Basin** (*45° 49′ N., 33° 24′ E.*).—A private firm has built a basin at Tobiz for the export of grain, 210 feet in length, 175 feet in breadth, and 10 feet (3 m.) in depth, with a dredged channel to it from the bay 1,400 feet in length by 56 feet in breadth. Grain is shipped into barges from here and taken across to Khorli for export. The grain warehouses have a capacity of 4,800 tons.

**Bakal,** situated in the southwestern corner of the bay, has two piers which are used for embarking salt obtained from the salt pans in Bakalskoe Lake.

Anchorage in 4 to 5 fathoms (7.3 to 9.1 m.), shelly bottom, well sheltered from westerly winds, can be obtained eastward of Bakalskaya Spit.

**Aspect.**—Conspicuous objects westward of Bakal are the large mill on Byuiten farm, on an elevation southward of Bakalskoe Lake; a country house near the shore (a conspicuous white house with offices) westward of the mill; and farther westward coast guard station No. 8. Still farther westward is the belfry and five cupolas of the church at Akmechet, which is a good landmark for that place.

The coast gradually rises from Bakalskaya Spit toward Karamurun Point and becomes rocky and of a reddish color, but near Yarilgachskaya Bay it changes to white and drops again almost to sea level.

**THE KRIMEA.**—The Krimean Peninsula extends about 178 miles from east to west and 107 miles from north to south. Its figure is quadrilateral and the angles are directed to the cardinal points. From the eastern point, however, a peninsula stretches out between the Sea of Azov and the Black Sea, terminating on the shores of Kertch Strait. On three sides the Krimea is bordered by the Black Sea; on the northeast it is washed by the Sea of Azov. Its area may be about 8,600 square miles, and the neck of land at its northern extremity, by which it is connected with the continent, is about 20 miles long and 5 miles wide at Perekop. Its northeastern division is a steppe and has neither tree nor hill, but its southern part presents a far different appearance, the mountains rising to a considerable height and encircling valleys of great beauty and fertility.

**Northwest coast.**—The northwestern part of the Krimea is about 63 miles long from Kartkazak in Karkinitski Bay to Karamrun

Point, and is formed of elevated plains, which may be seen from a considerable distance. Its shores westward of Bakal Spit are bold and steep.

**Yarilgachskaya Bay** (*45° 35′ N., 32° 49′ E.*).—About 20 miles to the southwestward of Kiln Murun, the extremity of Bakalskaya Spit, is Kara Burnu, the northern point of the large Bay of Yarilgachskaya, which is bordered by a sandy beach and is prolonged by two large salt lakes.

The entrance is about 1½ miles in width, both points being fringed by rocky shoals. Within the entrance the shores of the bay are clean and the depths from 5 to 6 fathoms (9.1 to 11 m.), over a sandy bottom.

The northern part of the bay is sheltered from seaward by Kara Burnu and the rocky tongue ½ mile in length, which extends off it. The bay is open to westerly winds, and they blow frequently, rendering the anchorage untenable.

The village of Yaruilgach stands on a height eastward of Kara Burnu; its mills are visible from seaward. Near it is the coast guard station. No supplies are obtainable nearer than Akmechet.

**Akmechetskaya Harbor** (*45° 31′ N., 32° 42′* E.).—Akmechetskaya (or White Mosque) Harbor lies 6 miles southwestward of Kara Burnu and is much frequented by vessels running between Odessa and the Krimea. It may be recognized by the high tower of the church, which has a belfry with several cupolas and is elevated 200 feet (61 m.) above the sea. The remains of a tower stand upon the western point of the entrance, which is nearly ⅔ mile wide, but is narrowed to 600 yards by rocks bordering the points, shoal water extending 400 yards from the west point and 200 yards from the east. The harbor is nearly ¾ mile long and has a village on its southern shore.

**Light and beacons.**—A flashing white light, with red and green sectors, 40 feet (12.2 m.) above water, is shown from a yellow tower on the shore north of the village.

The light tower, 33 feet (10.1 m.) in height, is the front range beacon; the rear and pilot beacon is a mast with ball, 55 feet (16.8 m.) above the ground and 103 feet (31.4 m.) above the sea, situated about ½ mile southward of the former.

The pilot beacon and light tower in range, bearing 178°, lead eastward of the flat extending off the western point of the entrance, but over the flat extending from the next point within, in about 2½ fathoms (4.6 m.), a little eastward of a depth of 2 fathoms (3.7 m.) on the flat. The pilot beacon should be open to the eastward when passing this shoal. The light tower in range with the church of St. Zakhariah, which stands to the southward of the village, bearing 198°, leads just westward of the flat extending off the eastern entrance point in about 4 fathoms (7.3 m.); the marks should be open to the westward when abreast the extremity of this flat.

The yellow light tower in range with a mill with red iron roof situated on the hillside southward of the church, bearing 188°, leads into the harbor midway between the shoals extending from the entrance points.

**Anchorage.**—The best anchorage is about 600 yards 23° from the village in about 4¼ fathoms (7.8 m.), on a sandy bottom, midway between the two inner points of the bay. Between the village and the inner point, on the western shore, the coast recedes ½ mile to the southwest, forming a cove which is used by small vessels to load salt and in which they may anchor in 1½ to 2 fathoms (2.7 to 3.7 m.), sandy bottom, well sheltered from northwesterly and northerly winds, to which they would be exposed in the anchorage. The harbor sometimes freezes over in winter.

**Life-saving station.**—There is a life-saving station at the town near the pier.

**AKMECHET** village is on the southern shore of the bay.

**Piers.**—There is a depth of 8 feet (2.4 m.) alongside the stone mole at the northwestern extremity of the town. There is also a pier with a depth of 13 feet (4 m.) alongside on the eastern shore southeastward of the old battery, where vessels ship salt.

**Telegraph.**—There is a telegraph station in the town.

**Hospital.**—There is a hospital at the town.

**Coast.**—**Kipchak Cove** (*45° 29′ N., 32° 36′ E.*), a bight about 400 yards in length by 200 yards in breadth, with steep shores, at 5 miles southwestward of Akmechet, would afford shelter for small craft from all winds except those between north and northeast. On its western shore is the coast guard station at Tyuleni (No. 11).

**Karamrun Point**, the western extremity of the Krimea, is situated 11 miles southwestward from Akmechetskaya Harbor. It is steep and of a reddish color. Northeastward of it is a remarkable point which descends to the sea in four declivities.

**Karadzhinskaya Bay**, situated between Karamrun Point and Cape Tarkhankut, affords good anchorage in easterly winds in depths of from 5 to 10 fathoms (9.1 to 18.3 m.), but is open to the westward. Protection is given to this anchorage from northerly winds by Karamrun Point and from southerly winds by a rocky bank which extends 1 mile to the westward of Cape Tarkhankut. A large house with tower 108 feet (32.9 m.) above the sea, on the north shore of the bay, affords an excellent anchorage mark.

The village of Karadzha is situated at the head of the bay, and westward of the house with tower is a small wooden pier.

An iron mooring buoy is placed 600 yards southward of the pier.

**Karadzhinskaya Bay Light,** fixed white, 70 feet (21.3 m.) above the sea, is shown from a position near the house mentioned above at a height of 35 feet (10.7 m.) above the ground. This is a private light and is exhibited from June 13 to October 13.

**Life-saving station.**—There is a life-saving station with rocket apparatus on the beach southward of the village.

**Cape Tarkhankut** (*45° 21′ N., 32° 30′ E.*), 2½ miles southward from the southwestern extremity of Karamrun Point, is low and only visible from a short distance.

**Bank.**—The sunken rocky bank mentioned above extending from Cape Tarkhankut has near its outer end a depth of only 12 feet (3.7 m.) and many sunken rocks. It should not be approached, as it is dangerous.

An obstruction has been reported at a distance of nearly 2 miles 255° from the lighthouse.

**Cape Tarkhankut Light,** group flashing white, 117 feet (35.7. m.) above the sea, visible 16 miles, is shown from a circular stone tower painted white, 121 feet (36.9 m.) in height, situated on the extremity of Cape Tarkhankut. The lighthouse, with its three houses for the keepers and the stores, is inclosed by a stone wall. See Appendix IX, view H.

**Fog signal.**—A fog signal is made on a siren. (See Light List.)

**Signal station.**—A telephone station is annexed to the lighthouse. Vessels can communicate with the station by International Code, and telegrams will be forwarded to their destination to be paid for on delivery. Replies to telegrams will not be signaled to vessels.

**Storm signals** are shown near the lighthouse. See page 33.

**Winds.**—Near Cape Tarkhankut are often experienced changes of wind, squalls, or sudden calms, when the current makes the sea short and broken. Off the cape the wind generally hauls around to the northeastward during the night.

In winter the prevailing winds are from the northeastward; from March the number of southerly winds increases; and in summer during the day the southerly wind is the prevailing wind. Gales blow from northwest, southwest, and east, though the prevailing ones are from northwest. They occur most frequently in January and March, and most rarely in June.

Fogs are most frequent in spring, and rarely occur in summer; in winter they are more frequent than in autumn.

**Currents.**—In passing Cape Tarkhankut, or the Gulf of Perekop, a fairly strong current will be felt setting to the eastward with westerly winds and to the westward with easterly winds. See also page 260.

A change takes place in the color of the sea off Cape Tarkhankut, from a bright blue to a dirty and dark green, and the tint gradually deepens as Odessa is approached.

**Uret Point.**—From Cape Tarkhankut the coast trends eastward for 7 miles to Uret Point. On the eastern side of the point in the village of Oirat, with a minaret and two mills. Uret Point has shoal water off it, and the depth of 5 fathoms (9.1 m.) will be found nearly ½ mile to the southward. There is anchorage to the eastward of the point in about 9 to 10 fathoms (16.5 to 18.3 m.), over sand and mud, well sheltered from all northerly winds.

**The coast** from Uret Point bends in to the northeastward and eastward for 9 miles, when the cliffs disappear and a sandy beach commences, which trends to the southeast for 22 miles to Eupatoria Point. Westward of the village of Terekli As, situated 11 miles eastward of Uret Point, is the large salt lake of Donuzlav, separated from the sea by a narrow tongue of sand 5 miles in length.

Between this lake and Eupatoria Point are several small salt lakes with small piers on the coast, with depths of from 8 to 10 feet (2.4 to 3 m.) alongside, for embarking salt. A depth of 10 fathoms (18.3 m.) will be found at 1¾ miles off this coast.

Aircha village, 7 miles from Eupatoria Point, and the coast guard station southward of it are the only conspicuous objects on this stretch of coast. The flat fronting the shore in this section extends nearly 1 mile off in one place, with depths under 5 fathoms (9.1 m.).

**Eupatoria Point** (*45° 09′ N., 33° 16′ E.*) is low and sandy, and should be approached carefully, as the soundings shoal quickly from 7 fathoms (12.8 m.) to 16 or 18 feet (29.3 or 32.9 m.) on the shore flat.

**Shoals.**—A shoal of 6 fathoms (11 m.) and one of 5 fathoms (9.1 m.) are situated southwestward of Eupatoria Lighthouse, at distances of 2.1 miles and 1.8 miles, respectively.

**Buoy.**—A red spar buoy with inverted cone top mark is moored outside these dangers, with the lighthouse bearing 51°, distant about 2 miles.

**Eupatoria Point Light,** alternating fixed and flashing white and red, 53 feet (16.2 m.) above the sea, visible 12 miles, is shown from a circular white iron tower with red lantern, 51 feet (15.6 m.) in height, situated on Eupatoria Point. (See Light List.)

**Fog Signal.**—A fog signal is made on a gun.

**KALAMITA BAY.**—From Eupatoria Point the coast again bends eastward 7 miles. It then trends to the southward for 24 miles, where it makes a short turn to the westward to Cape Lukul, thus forming Kalamita Bay.

The shore of Kalamita Bay is low and sandy for about 13 miles and is bordered by salt lakes, with small piers along the coast for shipping it. Those abreast Sakskoe Lake have depths of 9 and 14 feet (2.7 and 4.3 m.) alongside, and from them some 30,000 tons of salt are shipped yearly. Near these piers are two fairly large sheds, conspicuous from seaward. Tuzla Pier has a depth of 11 feet (3.4 m.) and Kizilyar 9 feet (2.7 m.). Vessels anchor off the piers.

Beyond Lake Kichik-bel the coast is low, with red sand cliffs, as far south as the Alma, whence it becomes higher, with steep cliffs, and table-land within.

The mouth of Bulganak River, 5 miles northward of Cape Lukul, is marked by a guardhouse on the north side of a deep gulley in the cliffs.

**Shoals.**—A rocky ridge of sandstone, varying in width from 100 yards to ¼ mile, with depths of from 5 to 7 fathoms (9.1 to 12.8 m.), fronts the shore of the bay at a distance of from 3½ to 4 miles from it. This ridge is steep-to on its western side, rising suddenly in places from a depth of 9 or 10 fathoms (16.5 or 18.3 m.). It extends from a position 2½ miles southward of Karantinni Point to the parallel of the southern end of Kichik-bel Lake. On this ridge there is a head of 5½ fathoms (10.1 m.) westward of Kizilyar Lake, and another near the southern extremity of the ridge, abreast of Kichik-bel Lake, with a least depth of 5 fathoms (9.1 m.) and 3½ miles from the shore.

The 5-fathom (9.1 m.) curve follows the shore from Eupatoria to the northern end of Kizilyar Lake at a distance of from ¾ to 1 mile. Southward of this vessels should not approach the shore within 1¾ miles, on account of detached patches lying outside the 5-fathom (9.1 m.) curve, and the bottom is generally uneven. Westward of Khanski coast guard station, situated northward of Nikolaevka (*44° 58′ N.*, *33° 37′* E.), there is a 3½-fathom (6.4 m.) shoal at 1½ miles from the shore.

**Wreck.**—A sunken wreck is charted about 5 miles southeastward from Eupatoria Lighthouse.

**Light buoy.**—A light buoy showing a flashing white light is located about 15 miles south-southeastward of Eupatoria Point Light.

**Buoys.**—Twelve spar buoys, for the use of the Russian fleet, have been moored in Kalamita Bay in range 145° from Eupatoria, the northern one being about 4 miles from the town. They are ½ mile apart, the two northern, two southern ones, and two middle ones being surmounted by globes, as charted.

**Life-saving station.**—Sakskoe station, with rocket apparatus, is near Tuzla Pier and coast guard station.

**Mooring buoys.**—There are two red mooring buoys in the bay, for the use of the regular passenger steamers, from which lights are shown when necessary. Also three white mooring buoys close in for small vessels.

**Fogs** are most frequent in autumn and in spring, and most rare in February.

**EUPATORIA ROAD.**—**Karantinni Point,** southward of the town of Eupatoria, is low and is bordered by a sand flat which extends 500 yards southeastward of it with depths of under 3 fathoms (5.5 m.).

**Landmarks.**—The Armenian Church, a large building with a cupola; a mosque near the shore, with a large Byzantine cupola; and the orthodox church, with a green cupola, to the eastward of the mosque, are the principal objects seen when approaching the town.

There are several windmills eastward of the town on the narrow neck of land separating the northern end of the great salt lake of Eupatoria or Sivash from the sea. To the southeastward of the town may also be seen the summits of several mountains on the southern coast of the Krimea, the most remarkable being Chatir Dagh, 4,970 feet ( 1,514.9 m.) high.

**Buoyage.**—A green light buoy, showing a fixed green light, is moored 520 yards east-northeastward from the lighthouse on Karantinni Point. Another light buoy, painted red and showing a fixed red light, is moored 940 yards east-northeastward from the same lighthouse.

A cask buoy is moored 700 yards northeast from the lighthouse. Another cask buoy is moored ½ mile east-northeastward from the lighthouse.

A spar buoy with two brooms, bases apart, is moored 300 yards 93° from the lighthouse, and a conical buoy is moored 720 yards 128° from the lighthouse.

**Eupatoria Road Light,** occulting red, 30 feet (9.1 m.) above the sea, is shown from a white iron house on piles situated on the extremity of Karantinni Point. (See Light List.)

**Fog signal.**—A fog signal is made on a bell.

**A fishing light,** showing fixed white, is located about 300 yards east of Eupatoria Road Light.

**Anchorages.**—Vessels anchor to east-southeastward of Karantinni Point and to the southward of the mills situated to eastward of the town, in depths of about 5 fathoms (9.1 m.), over a sandy bottom.

Small vessels anchor nearer the shore, in 2½ to 3 fathoms (4.6 to 5.5 m.) of water, between the town pier and Karantinni Point, the spit off the latter affording some protection from the sea which rolls in with southwesterly winds and which sometimes renders the anchorage unsafe. Easterly winds cause a choppy sea in this anchorage, which hinders loading.

This roadstead is dangerous during winds from southeast to west-southwest.

The depth in the roadstead is said to be gradually decreasing.

The quarantine anchorage is about ½ mile eastward of Karantinni Point.

**Lifeboat.**—There is a lifeboat and rocket station.

**EUPATORIA.**—Eupatoria is situated on low, flat, and sandy ground in the northern bight of the bay, and is a summer health resort. It has mud baths, excellent sea bathing, and an extensive sandy beach for open-air and salt cures. There is an electric railway system in the town which extends to Mainak, where there are villas and sanatoria.

The population in 1912 amounted to about 18,000. The summer season adds about 10,000.

**Piers.**—There are seven piers, of which there are three in the eastern part. Two of these are used for loading grain; the third has a pipe line for pumping kerosene. In the western part are four piers, two private and two Government piers, the Customs and Quarantine, the latter being near the point. With the exception of Russian Steam Navigation Co.'s pier, which has a depth of 7 feet (2.1 m.) at it, all the piers have less depths. There are a number of warehouses for storing grain within the piers.

**Supplies.**—There is no coal kept in stock. Meat, poultry, and vegetables can be obtained. Water is obtainable at the quarantine station, and water is laid onto the Customs Pier.

**Trade.**—The principal exports are wheat, hides, and tallow; and salt from the adjacent salt lakes is shipped to the Russian Baltic ports.

**Communication.**—The steamers of the Russian Steam Navigation Co. and Russian Co. keep up regular communication with Russian Black Sea ports, except when hindered by bad weather, which prevents landing. The town is connected by rail with Sarabus on the Sevastopol Railway.

There is telegraphic communication with all parts.

**Hospital.**—There is a small hospital.

**Quarantine.**—There is a health office in the town.

**Alma Bay** (*44° 51′ N., 33° 34′ E.*) lies within Cape Lukul, the southern extremity of Kalamita Bay, and the river of the same name discharges into it.

The 3-fathom (5.5 m.) curve extends from 400 to 600 yards off and the shoaling is gradual, but there are rocks off the south side of the Alma River. Outside the bay has regular soundings in a northwest direction, with a bottom of mud under a loose surface of gravel and shells.

**Cape Lukul** (*44° 50′ N., 33° 33′ E.*), the western point of Alma Bay, forms a remarkable projection, being nearly perpendicular, of little elevation, and of a reddish tint. A flat extends 1 mile offshore northward of the cape, and rocks nearly dry lie ½ mile westward. This cape should not be rounded within 1 mile.

There is a very conspicuous windmill 4½ miles northeastward of the cape, forming a good landmark.

**Lukul Rock,** ½ mile northwestward of Cape Lukul, is an oval-shaped rocky patch of 2¾ to 3 fathoms (5 to 5.5 m.) nearly 400 yards long. The bottom is foul between it and the cape and to the distance of ¾ mile off the coast southward of the cape.

**Coast.**—From Cape Lukul to the Kacha River the coast is one steep, perpendicular, reddish cliff with a table top, and about ¾ mile offshore the soundings are very irregular, over a rocky bottom, patches of 3 fathoms (5.5 m.) existing near the 5-fathom (9.1 m.) curve, and one of 4½ fathoms (8.2 m.), with 8 fathoms (14.6 m.) around it, at 1,800 yards offshore. Vessels should not approach this coast within the distance of 1½ miles.

**Peter the Great Rocks.**—About 3 miles southward from Cape Lukul is Lukul Bluff, off which Peter the Great Rocks extend for a distance of about 1,600 yards within the 5-fathom (9.1 m.) curve with a depth of less than 6 feet (1.8 m.) about midway.

**Terrible Rock,** with 2 fathoms (3.7 m.) 600 yards from the shore, lies nearly 3 miles southward of Peter the Great Rocks.

**Buoys.**—The following buoys have been established to mark the outlying shoals from Lukul Bluff to Kacha River:

A red spar buoy with inverted cone as top mark is moored at a distance of nearly 1 mile seaward from Lukul Bluff in about 10 fathoms (18.3 m.).

A red spar buoy with inverted cone as top mark is moored in about 10 fathoms (18.3 m.) at a distance of 1.8 miles southward of the former at 1,400 yards offshore.

A red spar buoy with inverted cone as top mark is moored 700 yards outside Terrible Rock in about 10 fathoms (18.3 m.).

**Kacha Anchorage.**—There is good holding ground off the Kacha River in 11 to 12 fathoms (21.9 m.), mud, with the mouth of the river bearing 45° to 60°, distant 1 mile, and Lukul Bluff about 5°. Between this position and the river the soundings shoal gradually to the shore, and there is 4½ fathoms (8.2 m.) 400 yards from the beach. The mouth of the river is northward of the second pair of the measured mile beacons, and is near the center of the beach; it can be recognized by a white triangular sand patch on its south side.

**The coast** between the Kacha and Belbek Rivers, about 4 miles, presents much the same appearance as to the northward, except that the cliffs are more sloping. Off the Belbek the approach to the beach is more regular and less rocky. The beach extends about ½ mile southward of the river, beyond which the coast again rises to steep cliffs. The measured mile beacons are conspicuous. A large church is conspicuous in the valley through which the Belbek runs, and mountains rise in triple rows to the eastward, the table-lands of their summits, with their white edges, giving them the appearance of fortifications, the Chatir Dagh, towering above all to the height of 4,970 feet (1,460 m.) above the level of the sea.

**Measured distance.**—There is a measured distance off the shore between Cape Lukul and the entrance to Sevastopol Harbor, marked by temporary buoys.

**Buoy.**—Two cask-shaped buoys for mooring gunnery targets lie in the approach to Sevastopol Harbor at about 2½ miles northwestward from North Point.

**Gun practice.**—Gun practice by day and night is periodically carried out by the Russian Black Sea Fleet in the approach to Sevastopol, and the undermentioned regulations must be observed by all merchant vessels in the vicinity:

1. The firing ground area is contained within the following limits:

(*a*) On the south by the parallel passing through Cape Khersonese Lighthouse.

(*b*) On the west by the meridian passing 10 miles to the westward of the foregoing lighthouse.

(*c*) On the north and east by the coast line between Eupatoria Point and the foregoing lighthouse.

2. Vessels firing will fly Z flag of the International Code by day and exhibit a red light by night.

3. Firing will be carried out at both stationary and towing targets.

4. Merchant vessels should pass the vessels firing on the side opposite to that on which are the targets.

If it is impossible to pass on the side opposite, the vessel should not approach the line of fire unless the flags specified in clause (2) have been lowered halfway or until the red light has been extinguished. The vessel should then immediately proceed, in order to pass the line of fire.

5. Vessels will, if possible, be informed of night firing through the Governor of Sevastopol, and if circumstances permit guard vessels will be anchored near the firing area.

6. The adoption of these measures does not, however, guarantee security to vessels proceeding without lights, and therefore sailing vessels proceeding in the firing area from sunset to midnight must show as frequently as possible their regulation light, even if they do not hear any firing, as with light guns the sound may not be audible at the place where the projectiles are falling.

**Cape Konstantin (Konstantinovski)** (*44° 38′ N., 33° 31′ E.*), nearly 2½ miles south of Belbek River, is the northern entrance point of Sevastopol Harbor. Its western extremity is known as North Point (Point Syebernaya), and on its southern extremity is old Fort Konstantin.

**Shoal.**—The cape is fronted by a rocky shoal extending ½ mile off North Point, on which there is a patch with only 3 feet (0.9 m.) water 400 yards from the shore, while the 5-fathom (9.1 m.) curve is found ½ mile from the cape.

**Buoys.**—The western extremity of the shoal is marked by a red light and whistle buoy showing a flashing white light and a red spar buoy with flag top mark in about 7 fathoms (12.8 m.). The southern side of the shoal and the southern extremity of the shoal off Fort Konstantin are marked by two red buoys.

**Directions.**—A white watch house with red tiled roof, situated near the summit of Mount Rudolph, on the southern side of the entrance to Sevastopol Harbor, kept in range with the cemetery chapel in the valley beneath it, bearing 163°, leads clear of the reef extending from Cape Konstantin and between it and the 6-fathom (11 m.) patch westward of the line. Vessel of heavy draft should approach southward of this patch with Inkerman Lights in range, as the bottom is irregular on the above range.

**SEVASTOPOL HARBOR.**—The harbor of Sevastopol, open to the westward, is nearly 4 miles in length and about ¾ mile wide at its broadest part.

The holding ground is good, and it is esteemed to be one of the best and safest harbors in the Black Sea. It has a depth of 8 to 10 fathoms (14.6 to 18.3 m.) in mid-channel, with muddy bottom, to within about 1 mile from its head, where it becomes shallower. The 3-fathom (5.5 m.) curve is nearly ½ mile from its head.

**Aspect.**—Its head is the Inkerman Ravine, which, with the harbor, is the longest of those on the western coast of the Krimea. The chalk cliffs of Inkerman Valley (Dolina Inkermanskaya) are contiguous to the upper waters of the harbor or inlet, whence, gradually becoming lower, they continue along both shores of it, on the northern as far as Cape Konstantin, while on the southern shore, passing out through the harbor, they extend as far as Cape Khersonese.

Approaching Sevastopol from the northwestward Chatir Dagh, 4,970 (1,460 m.) feet high (*44° 44′ N.*, *34° 18′ E.*), on the southeastern side of the Krimea, is a conspicuous object in clear weather, and is also so from the southeastward. Cape Tarkhankut is the best landmark approaching from Odessa, after passing which Chatir Dagh comes in sight, and later Cape Khersonese. On a nearer approach the reddish coast on the north side of Sevastopol entrance, and shortly after the buildings on the heights northward of the town, will appear, and then those on the southern shore, with its cathedral and churches, and finally the entrance to the harbor itself, which is entered with Inkerman Range Lights and beacons in range.

On a hill on the north side of the harbor the cemetery church, in the form of a four-sided pyramid with a large cross on the top, 324 feet (98.8 m.) above the level of the sea and 108 feet (32.9 m.) above the ground, is also a conspicuous object from the offing.

**The northern shore** of Sevastopol Harbor is much less indented than the southern shore and safer to approach.

**Fort Michael (Mikhailovskaya).**—At 1,200 yards eastward of old Fort Konstantin is the site of Fort Michael, with a point between on which is the site of Nakhimova Battery.

**Buoys.**—The 5-fathom (9.1 m.) curve lies 350 yards off the point and 200 yards off Fort Michael, the 5-fathom (9.1 m.) curve off Nakhimova Bateery being marked by a red conical buoy with inverted cone and that off Fort Michael by a red spar buoy with inverted cone. The shore flats, with depths of 2 to 3 fathoms (3.7 to 5.5 m.), extend nearly off to this curve.

**Light buoy.**—A red light buoy surmounted by a cone, apex down, and showing a flashing red light, is moored about ¼ mile south of Fort Michael.

**Sukhaya Cove.**—At about 400 to 800 yards eastward of Fort Michael are Syevernaya Cove and Sukhaya Cove; the latter affords anchorage in from 3 to 4 fathoms (5.5 to 7.3 m.).

Eastward of Sukhaya Cove the shore is fairly bold to Panaiotova Creek and Valley, on the western side of which are the artillery barracks with small piers fronting them, and at the head of the cove is a large dry dock; from there eastward to Gollandiya farm the 5-fathom (9.1 m.) curve is 200 yards offshore and steep-to.

**Buoy.**—A red spar buoy marks the edge of the shoal extending from the western entrance point of Sukhaya Cove.

**Shore.**—The shore line turns sharply southward from abreast Gollandiya farm for a distance of ¼ mile, forming a bight which affords anchorage in 3 to 5 fathoms (5.5 to 9.1 m.) with other than westerly winds.

From the sharp point of this bight the coast trends at right angles eastward to the head of the harbor, and is fairly steep-to as far as the Bakeries and the hospital in Sukharnaya valley, eastward of which are some white cliffs, and beyond them the northeast corner of the harbor, where is situated West Inkerman Lighthouse. There is secure anchorage for small craft in 2 to 3 fathoms (3.7 to 5.5 m.) off the Bakeries.

**Pier.**—A pier is situated on the shore southward of West Inkerman Lighthouse.

An area has been dredged off the wharf and in its approach to a depth of from 23 to 26 feet (7 to 7.9 m.). Near the wharf are two warping buoys.

**Range beacons.**—Two beacons on the shore when in range lead through the dredged channel up to the wharf.

This channel is also marked on its northern side by a red spherical buoy at the entrance and by two red conical buoys farther in; and on its southern side by two white spherical buoys with a black conical buoy midway between them.

The southern limit of the dredged area off the wharf is marked by three black conical buoys.

**Southern shore.—Quarantine (Karantinnaya) Bay,** on the south side of the entrance, at ½ mile west of Aleksandrovski Point, is about 600 yards in length from the depth of 10 fathoms (18.3 m.) at its entrance to about 7 fathoms (12.8 m.) northward of the quarantine flagstaff; thence its form becomes sinuous to its head, but affords shelter for small vessels from all winds. The bay may be recognized by the square tower with spire of St. Vladimira Church and by the other buildings of Khersonesski Monastery, situated on its western side. The channel at the entrance is about 200 yards wide between the 5-fathom (9.1 m.) curves bordering its point, and to which a berth of 150 yards must be given on entering.

**Vladimir Light,** alternating red and green, 58 feet (17.7 m.) above the sea, red light visible 6 miles, is shown from a white stone tower 38 feet (11.6 m.) in height situated between Khersonese Bay and Quarantine Bay.

**Beacon.**—A patch of 3½ fathoms (6.4 m.) lies about ¼ mile northward of the western point of the entrance, marked by a black buoy with cone top mark.

**Buoy.**—To the eastward of Quarantine Bay the shoal or flat fronting the southern shore of the harbor increases its distance off. A double point to the eastward of the bay is fronted by a reef extending 200 yards in a northwest direction from the western point and 400 yards northward from the eastern point, the latter being marked at its northern end in a depth of 42 feet (12.8 m.) by a black spar buoy with conical top mark.

**Aleksandrovski Point.**—About 500 yards eastward of the double point is Aleksandrovski Point, projecting farther to the northward and forming with Fort Konstantin the entrance of the harbor, barely ½ mile wide, which is reduced to 600 yards in width between the 5-fathom (9.1 m.) curves.

**Artilleriskaya (Artillery) Bay.**—About 600 yards farther eastward, at the foot of a steep point, the 3-fathom (5.5 m.) curve is less than 200 yards off it, forming the west side of entrance to Artillery Bay, which has a depth of 7 fathoms (12.8 m.) in its entrance and 3 fathoms (5.5 m.) near its head.

There is a conspicuous monument on the eastern entrance point of the bay.

This bay, as well as that to the eastward, is sheltered from northerly winds by the opposite shore. It is used by small trading vessels. Vessels that anchor in it during northwesterly or westerly winds suffer much from the ground swell, which often causes serious damage. A portion of the town of Sevastopol stands at the head of the bay.

**Buoy.**—A black spar buoy is moored in a depth of 10 feet (3 m.) off the western entrance point of Artillery Bay.

**Nikolaeveski Point** (*44° 37′ N., 33° 32′ E.*).—The rising ground of white rock which forms the promontory on which Sevastopol is built is 240 feet (73.2 m.) in height and separates Artillery Bay from South Bay. Nikolaevski Point, its low extremity, is bordered by a dangerous reef extending 100 yards from the shore, which must be carefully avoided and a berth of 200 yards given to it.

**Light buoys and buoy.**—A black light buoy showing a flashing white light is moored about 350 yards northward of Nikolaevski Point.

A black buoy exhibiting a flashing white light is moored in 30 feet (9.1 m.) at the northeastern extremity of the reef which borders Nikolaevski Point.

The northern extremity of the spit is marked by a black spar buoy, with conical top mark, in the same depth.

**Yuzhnaya (South) Bay.**—To the eastward of Nikolaevski Point lies South Bay, or the inner harbor, between two steep hills. This safe anchorage, which is formed by Nikolaevski and Pavlovski Points, is about 1⅓ miles in length from north to south and 400 yards wide at its entrance. It carries a depth of 6 to 9 fathoms (11 to 16.5 m.) and its shores are steep-to, with piers and wharves all around it. See page 282 for further description.

**Pavlovski Point.**—The eastern point of the entrance is fringed with rocks. From there the shore runs 1 mile to the eastward, to the entrance of Careening Bay. Sevastopol Naval Observatory, a two-storied white building with tower and flagstaff, is situated on Pavlovski Point. In the rear of the observatory are the buildings of the naval hospital.

**Buoys.**—Red spar buoys with inverted cones mark the north and western edges of the shallow water extending from Pavlovski Point in about 5 and 3 fathoms (9.1 and 5.5 m.), respectively.

**Careening Bay.**—Careening Bay, about 400 yards in length, has a depth of 4 to 5 fathoms (7.3 to 9.1 m.), but the entrance is only about 70 yards wide, expanding to about 130 yards within. Coal stores and a wharf belonging to the naval department are situated at the head of the bay.

**Buoy.**—A red buoy with an inverted cone top mark is situated at the eastern side of the entrance to this bay in about 3 fathoms (5.5 m.).

**Chernaya River** (*44° 37′ N., 33° 35′ E.*), which has its course through the beautiful valley of Inkerman, flows into the harbor about 1½ miles to the eastward of the Careening Bay. A deposit of mud has formed at the head of the harbor about 600 yards in extent out to the 1 fathom (1.8 m.) curve.

**Buoys.**—Four spar buoys, two red on the north side and two black on the south side, in 5 feet (1.5 m.) of water, mark the entrance to the river.

**Inkerman range lights.**—West Inkerman Light, alternating white and red, 299 feet (91.1 m.) above the sea, visible 24 miles, is shown from a square white stone lighthouse 40 feet (12.2 m.) in height, situated beyond the head of the harbor near the ruins of the town of Inkerman.

East Inkerman Light, fixed white, 642 feet (195.7 m.) above the sea, visible 24 miles, is shown from a square white stone lighthouse, situated 1.8 miles 95° from the front light.

These lights are in range 195° and are both screened so as to show only on the range line.

The hill on which the front lighthouse stands shows up white and is a good guide to the position of the lighthouse.

The rear lighthouse stands among trees and is difficult to distinguish.

Both lighthouses appear as three white houses joined together with a dark cone over the center one.

**Pavlovski Point Light,** flashing green, 18 feet (5.5 m.) above the sea, is shown from a white iron cylindrical hut 11 feet (3.4 m.) in height situated on Pavlovski Point, on the eastern side of the entrance to South Bay.

Lights are shown from lamp-posts at the landing place on Grafski Quay, southward of Nikolaevski Point.

**Submarine cables.**—The submarine telegraph cables, which cross the harbor between old Fort Konstantin and Aleksandrovski Point, are marked as follows:

Two pairs of beacons on Aleksandrovski Point and on No. 8 battery, respectively, each pair when in line bearing 185°, mark the limits of the space in which the cables are laid. Red lights are exhibited from the western beacons and green lights from the eastern beacons. The beacons are white, surmounted by white squares.

The shore ends of the cables are marked on the northern shore as follows:

On the face of Fort Konstantin by a white rectangle, marked (Телеграфъ) in black, and with the telegraph symbol.

To the northward of Fort Konstantin, at an elevation of 33 feet (10.1 m.) above the sea, by a gray beacon carrying a white disk marked with the telegraph symbol in black.

On the site of Nakhimova Battery by a gray beacon carrying a white disk.

A submarine cable crosses the harbor from the site of the Twelve Apostles battery to the southern shore. The shore ends are each marked by a beacon.

Other submarine cables are laid in the harbor, for which see chart.

**Prohibited anchorage.**—Vessels are forbidden to anchor in the area occupied by the submarine cables or between a line joining North Point and No. 10 battery on the west side and a line joining Fort Michael and Nikolaevski Point on the east side.

**Measured distance.**—Six pairs of beacons, marking a measured distance of practically 5 miles, are erected in the harbor and approach for the purpose of testing speed. The front beacons are surmounted by white triangles with the point upward, the rear beacons by white triangles with the point downward.

The first pair are situated in Gollandiya Cove; the second on the east side of Sukhaya Cove; the third on the south side of the harbor, between Artillery and Quarantine Bays; the fourth without the harbor, on the east side of Khersonese Bay; the fifth on the west side of Streletska Bay; and the sixth on the west side of Peschana Bay.

The accurate distance between each pair of beacons, from the eastern end, Gollandiya Cove, is: 0.983, 1.010, 1.005, 0.992, 0.998 mile, or a total distance of 4.988 miles.

The course for running over the distance is marked by a beacon above the white cliffs in range with the Inkerman Lighthouses, bearing 95°.

**Guard ship.**—A guard ship is anchored in the harbor entrance, off Fort Konstantin in summer and off Artillery Bay in winter.

**Port regulations.**—Vessels must stop before arriving abreast of the guard ship, in order that they may be visited by the health and customs officers and may receive directions for anchorage.

When the guard ship is anchored between the lines of range marks indicating the positions of the submarine telegraph cables, merchant vessels, having received permission to enter between sunset and sunrise, are to anchor eastward of the line of the eastern of these cables.

Merchant vessels are permitted to enter and leave the harbor at all times of day or night after examination.

Vessels wishing to enter at night must, when approaching Vladimir battery, show two blue lights on that side of the vessel, and then anchor for exmination before approaching the guard ship.

**Mooring buoys.**—There are a large number of mooring buoys in the harbor.

**Submarine practice.**—When submarine practice is taking place in Sevastopol Harbor a black ball over a white, blue, and red pendant will be hoisted on the guard ship and on the flagstaff near the commander in chief's house.

**Life saving.**—The guard ship is equipped with a lifeboat. A lifeboat is stationed on Paolovski Point and a life-saving refuge. There is a similar refuge on the western shore of Artillery Bay.

**INNER HARBOR OR SOUTH BAY.**—The bay eastward of the town, known as South Bay, is used by naval vessels, and to a very limited extent by merchant vessels also.

The harbor has depths of 6 to 9 fathoms (11 to 16.5 m.) and about 4 fathoms (7.3 m.) close to the shore, so that large vessels may lie secured almost close-in to it. There is a naval dockyard where there are torpedo-boat slips and storehouses.

There are several private wharfs in the harbor. At the head of the harbor are quays and storehouses for wheat, under the management of the municipality, where trading vessels berth.

The eastern side of the harbor is occupied by Government vessels and by a floating dock. The vessels on this side usually secure with their sterns to the shore. A bridge crosses the harbor just northward of the position of the floating dock. The naval barracks stand on high ground on this side, and on the low point of the peninsula northward of them is situated the Admiralty and Lazarev dockyard. Eastward of the peninsula is Dockyard or Korabelnaya Creek, leading to the dry docks and to the suburb of Korabelnaya.

There are numerous mooring buoys in the harbor for vessels to secure to.

**Winds.**—During the winter months the prevailing winds in Sevastopol are from the eastward. Sea and land breezes are very regular in the summer, the former blowing from 9 or 10 a. m. and the latter setting in at sunset. Gales are frequent in November and March. They blow especially from the southward, from which direction the harbor is well sheltered. Gales from the northeastward are comparatively rare.

**Storm signals.**—Storm signals are hoisted on a special signal staff situated in the upper part of the town near the house of the commander in chief.

Bulletins giving the state of the weather in the Black Sea and Sea of Azov are posted up daily on Grafski Quay.

**Submarine cable.**—A submarine telegraph cable crosses the harbor from Lazarev dockyard to a point on the western shore. Its direction is marked by two gray columns in range, situated on the western side of the harbor, each surmounted by a disk marked (Кабель,) and by a single column on the eastern side of the harbor. Southward of the line of the cable is a red cask buoy marked with the telegraph symbol in white, to which vessels may make fast. Vessels are prohibited from anchoring in the vicinity of this cable.

**Deviation buoy and marks.**—A buoy painted in red and white vertical stripes, solely for the use of vessels wishing to swing for adjustment of compasses, lies 350 yards northeastward of Pavlovski Point.

Southward of the dockyard and facing the declivity behind it is a stone wall on which are painted vertical red lines, which when in range with the western chimney of the machinery works in the dockyard indicate the bearing of the chimney for every degree from south to 120°.

**Pilots** for Sevastopol can be summoned by radio.

**Navigational information.**—An office has been established in the Directorate of Hydrography and Pilotage (old port, building No. 15) where seamen will be given information with regard to the navigation of the Black and Azov Seas.

To obtain the information an officer must be sent from the ship, who must take with him charts showing her proposed route.

The office is open from 10 a. m. to 4 p. m.; on Saturdays the hours are 10 a. m. to 2 p. m.

**Caution.**—It is not advisable to leave boats afloat for too long a time in this harbor, as it abounds with worms which attack the wood.

**SEVASTOPOL** (*44° 37′ N., 33° 31′ E.*).—The town of Sevastopol is situated on an eminence dividing Artillery and South Bays. The cathedral of St. Vladimira, a white building with gray cupola surmounted by a gilded cross, towers above the other buildings in the town and is a conspicuous object when approaching from seaward. The town has broad paved streets regularly laid out, is kept clean, and lighted by electricity. The higher portion of the town (Gora) is connected with the lower by gentle inclines and flights of steps. At the two opposite ends are two boulevards, a street railway service encircles the town, and there are over 30 educational establishments.

Sevastopol is the permanent residence of the commander in chief of the port, the prefect of Sevastopol, the captain of the military port, the director of lights and pilotage of the Black and Azov Seas, and the commandants of the military forces.

Sevastopol is a military port and can only be used by foreign vessels requiring docking or repairs, except by special permission. The commercial port was at Theodosia, but Streletska Bay, in the approach to Sevastopol, is now the commercial port.

The population in 1914 was 61,849, and the climate is stated to be very healthy.

**Dry docks.**—See Appendix I.

**Repairs.**—Ironclads of 12,000 tons have been built in the dockyard for the Russian Navy. Engines and boilers can be constructed, and there is a large factory for repairing machinery. There are sheers lifting 60 tons, and two floating cranes lifting 100 tons and 20 tons; also a pontoon for masting vessels.

**Coal and supplies.**—The Government and a private company maintain large stocks of coal for their own use, obtained from the collieries. There are private stocks of coal in the town. Coaling is done by barges or alongside the coaling piers, in a depth of about 18 feet (5.5 m.). Fresh meat, vegetables, and bread are plentiful. Water is supplied from the hydrants on the quays.

**Trade.**—The exports consist chiefly of grain, flour, cattle, and stone from the Inkerman quarries, and are for the most part shipped direct to Constantinople. The imports consist principally of fruits, vegetables, olive oil, rice, seeds, timber, and hardware.

**Communication.**—Rail to Petrograd or Moscow via Kharkov; also to Theodosia and Kertch via Dzhankoi; also with Eupatoria by branch line from Sarabuz. There is steamship communication (through Streletska Bay) with Odessa and other ports of the Black Sea daily.

There is telegraphic communication with all parts; cable to Varna. There is a good road running along the coast to Yalta.

**Radio.**—There is a radio station at Sevastopol which sends out weather bulletins and navigation warnings. (See H. O. Pub. No. 205, Radio Aids to Navigation.)

**Time signal.**—A time signal is made from the flagstaff on the roof of the observatory on Pavlovski Point at $12^{h}\,14^{m}\,07.6^{s}$, standard time, corresponding to $10^{h}\,00^{m}\,00^{s}$ G. C. T.

A black ball is hoisted at 5 minutes before the signal is made. Should the signal fail, a red ball will be hoisted and will remain in position for 10 minutes. Should a wind with a force of 4 be blowing, the signal will be made by a red flag hoisted on the same flagstaff.

A gun is fired at the instant of the dropping of the ball.

**Hospital.**—In cases of sickness admission to the town hospital is given to seamen.

**Quarantine.**—Vessels coming from infected ports are subjected to three days' quarantine, to undergo which they must proceed to Theodosia.

**The coast** from Sevastopol Harbor to Cape Khersonese, nearly 6 miles, trends in a general west-southwesterly direction and is rocky, moderately high, and deeply indented by several bays.

**Khersonese Bay,** a small sandy bay about 1,200 yards to the westward of Quarantine Bay, has a depth of 4 fathoms (7.3 m.) at its entrance. A reef extends nearly 400 yards to the northward from its eastern point.

**STRELETSKA (STRYELETSKAYA) BAY** (*44° 37′ N., 33° 28½′ E.*) forms the southern side of the approach to Sevastopol Harbor. It is about 1 mile in length, 400 yards wide in its entrance, opening out inside in its central portion, and has depths of 9 to 10 fathoms (16.5 to 18.3 m.), over a mud bottom.

**Entrance.**—The eastern entrance point within the 5-fathom (9.1 m.) curve is foul to the distance of 100 to 150 yards, and the western point to about 100 yards.

The bay is easily entered both by day and night.

**Shoals.**—A rocky flat fronts the shore for ½ mile westward of the west point of the entrance to the bay and extends 600 yards seaward.

**Buoys.**—Two black spar buoys with conical top marks mark the edge of the flat extending from the western side and two red spar buoys with inverted conical top marks that on the eastern side of the entrance, which is 250 yards wide between the buoys.

A red can buoy is moored about 800 yards northwestward of the western entrance point.

**Range lights.**—The front light, fixed red, 76 feet (23.2 m.) above the sea, visible 7 miles, is shown from a gray iron framework pillar on the western side of the head of the bay.

The rear light, fixed green, 109 feet (33.2 m.) above the sea, visible 9 miles, is shown from a gray iron framework pillar 370 yards 188° from the front light.

These lights in range lead through the entrance to the bay. (Extinguished, 1925.)

**Extracts from regulations.**—Vessels arriving in the bay are moored in line, and in the harbor made fast to mooring buoys or to the quays.

All anchors must be buoyed.

Vessels must stop or slow down on demand from a customs or harbor official. The waving of a red flag by day or a red light by night is a signal to stop.

Vessels are not allowed to pass each other in the port, and those proceeding in the same direction must be 350 feet apart.

Merchant vessels under way in the port must always give way to naval vessels.

Masters of vessels should procure for themselves full copies of the regulations of the port.

**Harbor works.**—A mole or breakwater about 700 feet in length has been constructed on the eastern side of the harbor to protect a quay extending a distance of about 900 feet southward of it in a 160° direction. A number of bollards have been embedded in the quay for vessels to secure to and two mooring buoys placed, each about 420 feet from the quay. Another quay, 560 feet in length, extends from the southern end of the above quay to the shore in a direction parallel to the breakwater. Vessels lie securely alongside the quays.

A basin 560 feet long and 455 feet wide has been formed southward of the above, on the southern side of which is a small pier.

The commercial port has only recently been opened, and therefore it is impossible to say anything of its importance, but it is anticipated that it will be greatly used for the export of grain produce, not only of the Krimean area but of more remote localities, South Russia and even Western Siberia, especially in the winter months, when the Azov ports to which their produce gravitates are closed by ice.

Apart from the quays, no provision has yet been made for landing and embarking passengers and goods.

**Peschanaya Bay** lies 1 mile to the westward of Streletska Bay, but as the water in it is shallow vessels anchor off its entrance in 6 to 10 fathoms (11 to 18.3 m.). A small island lies near the head of the bay with foul ground extending about 200 yards seaward of it.

**Mooring buoys.**—Three mooring buoys have been established at 1.7 miles northwestward and one mooring buoy 2.4 miles northeastward of Peschanaya Beacon for the use of the Black Sea Fleet Training Squadron, as shown on chart.

**Dvoinaya Bay** lies between Peschanaya Bay and Cape Khersonese, and is divided into two arms by a peninsula a few hundred yards distant within the common entrance, which is nearly 1 mile wide and ½ mile wide between the 5-fathom (9.1 m.) curves.

The eastern arm is Kamiesh (eastern) Bay, and the western Kazach (western) Bay. Both are exposed to northerly winds, but Kamiesh is the better of the two, both as regards convenience and safety.

In the outer parts of these bays the bottom is a muddy sand, with gravel and shells; in the inner part the ground is more tenacious. These bays offer secure anchorage with offshore winds, but how far they are safe with northerly winds is not known.

Vessels bound to Sevastopol, waiting orders or for a favorable wind, can anchor midway between the entrance points in about 12 fathoms (21.9 m.).

**Kamiesh (Kamishevaya) Bay** (*44° 35′ N., 38° 25′ E.*), the eastern arm, is 1¾ miles in length in a north and south direction, ½ mile in breadth between its entrance points, reduced to a little under 400 yards abreast Stefaniya farm.

It affords anchorage in depths of 6 to 16 fathoms (11 to 29.3 m.), mud bottom, and is used by the Black Sea Fleet.

Its shores are fronted by flats, rocky in places, varying from 100 to 150 yards in distance within the 3-fathom (5.5 m.) curve. Off the eastern point of the entrance the 5-fathom (9.1 m.) curve is 300 yards offshore, and off the western point, where is a coast guard station surrounded by trees and the remains of an old French battery, to a distance of about 500 yards in a northerly direction. The head of the bay is shallow for ½ mile from its head, with depths of 1 to 2 fathoms (1.8 to 3.7 m.).

**A patch** with depths of 3¾ to 4¾ fathoms (6.9 to 8.7 m.) lies on the eastern side of the fairway, with depths of 7 to 9 fathoms (12.8 to 16.5 m.) around it.

**Buoys.**—The flat extending westward of the eastern point of the entrance is marked by a red spar buoy with inverted cone in about 5½ fathoms (10.1 m.) at 400 yards offshore.

The flat extending off the western point is marked on the edge of the 5-fathom (9.1 m.) curve by two spar buoys. The one at the northern extremity is painted red and carries a cone top mark, point down, and the other, near the northeast extremity, is painted black and carries a cone top mark, point up, as charted.

**Anchorage.**—There is good anchorage in 7 to 10 fathoms (12.8 to 18.3 m.) eastward of the coast guard station, and in 6 to 7 fathoms (11 to 12.8 m.) off Stefaniya farm, but more confined. Here the shore flat is steep-to, dropping from 2 to 4 and 5 fathoms (3.7 to 7.3 and 9.1 m.).

**Kazach (Kazachya) Bay**, the western arm, is divided by Dvoinaya Point into two arms, the western of which is shallow out to and abreast Dvoinaya Point; the eastern, counting from its entrance, is about 2 miles in length, but the depths are under 3 fathoms (5.5 m.) at ¼ mile beyond Dvoinaya Point, and that portion is only available for small craft. The short of the outer portion is fronted by shallow flats to the distance of about 100 yards, but a rocky ridge extends about 500 yards northward of Dvoinaya, the dividing point of the two arms.

**Kazachya Shoal.**—The western point of the entrance is fronted by Kazachya Shoal or Flat, which extends about 300 yards northeastward of Kazachi Point (*44° 35′ N., 33° 24′ E.*) and 400 yards northward of that point within the 3-fathom (5.5 m.) curve. The 5-fathom (9.1 m) curve is about 500 yards from the point.

**Directions.**—Peschanaya Point inner beacon bearing eastward of 78° leads northward of Kazachya Shoal.

**Buoys.**—The northeastern extremity of the shoal is marked by a black spar buoy with cone or triangle top mark in about 6 fathoms (11 m.).

A red spar buoy without top mark is placed in about 2½ fathoms (4.6 m.) within the 3-fathom (5.5 m.) curve off Dvoinaya Point. The buoys off the eastern point, which separates Kazachya and Kamiesh Bay, have been described with the latter.

A spar buoy is moored about 700 yards northwestward from Kazachi Point.

**Aspect of the coast.**—Coming from the southwestward towards Sevastopol the land is very remarkable, forming three capes or headlands. The southernmost, Cape Aiya, makes as a high, bold bluff.

The next to the northward, Cape Feolent, is moderately high, with three notches like steps in it, and between these headlands lies Balaklava Bay. Cape Khersonese, the northernmost, is long and low, and will be readily known by the lighthouse on it.

**Cape Khersonese (Khersones)** (*44° 35′ N., 33° 23′ E.*).—The western coast of the Krimea terminates in a low, shelving peninsula, the extremity of which is named Cape Khersonese. This cape is bordered by a reef extending within the 5-fathom (9.1 m.) curve about 400 yards westward and 500 yards southwestward.

There is good anchorage to the southward of the lighthouse with east, northeast, and north winds.

**Cape Khersonese Light**, flashing white, 108 feet (32.9 m.) above the sea, visible 16 miles, is exhibited from a white circular stone tower 105 feet (32 m.) in height located near the extremity of the cape. (See Light List.) See Appendix IX, View I.

**A fog signal** is made by a siren.

**Signal station.**—A signal station is established here, and telegrams communicated by the International Code will be forwarded, being paid by those to whom they are addressed.

**Storm signals** (day and night) are shown from a support over the fog bell.

**Directions.**—A vessel in rounding Cape Khersonese from the southward should keep Cape Feolent, a high, perpendicular cliff, open of Cossack Point, a nearer and lower bluff on which is a conspicuous gantry, until the lighthouse on the cape bears 133°, or Fort Konstantin is seen well open of the north coast of the peninsula, bearing 75°, or eastward of that bearing. As a general rule the points on the north side of the Khersonese Peninsula should not be approached nearer than ½ mile.

**Aspect.**—The general character of the coast from Cape Khersonese to Kertch Strait is hilly. From the cape to Theodosia it is backed by the Taurus Hills under several names. As far as Cape Aiya cliffs, inaccessible in most places, drop precipitately to the sea. The most prominent peaks from the sea are Sonnalik, near Cape Aiya, 1,897 feet (578.2 m.) high; Cape Aiya, 1,820 feet (554.7 m.); Chatir Dagh (before mentioned), 4,970 feet (1,514.9 m.); Mount Demirdzhi, eastward of it, 3,990 feet (1,216.2 m.); and Eski Dagh and Kara Dagh, on either side of a valley eastward of Cape Meganom, 2,100 and 1,890 feet (640.1 and 576.1 m.), respectively; the latter is on the coast.

The seaward slopes of this range between Capes Aiya and Meganom are known as the south coast of the Krimea; they are sheltered by mountains attaining a height of over 3,500 feet (1,066.8 m.) from northerly winds. Here, with a comparatively warm climate, tempered by the proximity of the sea, grows luxuriant and variegated vegetation, among which are many villages.

Farther eastward the eastern portion of the Krimea is known as Kertch Peninsula. The mountains disappear eastward of Kara Dagh, and eastward of Theodosia there is apparently no hill above 630 feet (192 m.) in height.

**Distinctive marks during fogs.**—On the cliffs in certain spots between Cape Khersonese and Yalta artificial distinctive white marks of various shapes have been painted. These help the mariner to fix his positions during fogs, which are usually some distance above the sea, so that vessels near the shore can identify these marks. They are referred to in their proper places.

**Winds.**—Off the southern coast of the Krimea the prevailing winds are from northwest and northeast; the latter blow along shore, and in winter are violent at times, blowing harder nearer the coast.

Southeast, south, and southwest winds are rare and not prolonged. In the summer calms of long duration occur, being interrupted only by light winds off the land at night. From Cape Aiya to Yalta a precipitous coast ridge hangs over the coast and screens the area near the shore from the wind. Eastward of Yalta the Yala Ridge recedes from the coast, and from the ravines between the hills a land wind blows at night.

In Theodosia Bay in the winter half the prevailing winds are from northwest; from April to October the northwest wind only blows in the morning. During the day the wind is from south, often strong; the evenings are for the most part calm.

**Current.**—The current runs westward along the coast, and is stronger near the coast abreast the headlands, and especially between Kertch and Cape Chauda; offshore the current is weak and nil in places.

**Cape Feolent** (*44° 30′ N., 33° 29½′ E.*).—From Cape Khersonese the coast is steep-to and trends to the southeast 7 miles to Cape Feolent, which is a high, perpendicular cliff rising to 526 feet (160.3 m.), with a sharp conical rock close off it. The extremity of the point is only a few feet above the level of the sea, and a reef extends nearly 400 yards westward from the point. (See Appendix IX, views J and K.)

**St. Georgiya Bay—Anchorage.**—From Cape Feolent the coast becomes more elevated and bends to the eastward, forming St. Georgiya Bay, which has depths of 7 to 10 fathoms (12.8 to 18.3 m.). A patch with a depth of 3 fathoms (5.5 m.) lies ¼ mile northeastward of the cape. Vessels are sometimes induced to anchor in the bay in northwest winds southward of the monastery of St. Georgiya, which stands nearly 1 mile to the eastward of the point. The steeple of the monastery church is conspicuous from seaward.

This anchorage may be of service to a steam vessel when waiting under the land until a northerly or northeasterly gale moderates sufficiently to allow her to round Cape Khersonese.

**Shoal.**—A shoal with a depth of 3 fathoms (5.5 m.) over it is shown on the chart to be situated in the western part of the bay 500 yards 56° from the southern tangent of Cape Feolent.

**BALAKLAVA HARBOR** (*44° 30′ N., 33° 36′ E.*).—The entrance to Balaklava Harbor, which is not easily distinguished, lies about 4½ miles to the eastward of Cape Feolent, the intervening coast consisting of high steep cliffs of a reddish color, where landing is impossible, except in St. Georgiya Bay. An old Genoese tower and some ruined fortifications stand on the eastern point of the entrance, and the extremity of the western entrance point is marked by a whitewashed rock.

The port, inclosed by steep and rocky hills of a reddish color, is about ¾ mile long from north to south and only 120 yards wide at its narrowest part. Nearly one-fourth of it is filled up with mud flats, which have been brought into the head of the port by a rivulet running through a valley to the northward. There is a depth of 15 fathoms (27.4 m.) in the channel at its entrance, with a gravel bottom, 6 to 8 fathoms (11 to 14.6 m.) in its narrow part, 7 fathoms (12.8 m.) abreast of the town, and 3 fathoms (5.5 m.) nearly 400 yards from the head of the port, over a muddy bottom, where the mud flat before mentioned has less than 6 feet (1.8 m.) on it. A rock above water, bordered by sunken rocks, lies 400 yards from the head of the harbor and about 70 yards from the western shore.

**Balaklava Rock,** about 1½ miles southeastward of the entrance to Balaklava Harbor and 550 yards offshore, has a depth of 1¾ fathoms (3.2 m.) and from 6 to 9 fathoms (11 to 16.5 m.) around it. The rock bears 197° from a white mark on a black cliff point in the curve of the bay. Foul ground exists between the rock and the white mark on the cliff.

**Buoy.**—A red spar buoy with inverted cone as top mark is moored on the southwestern side of the rock.

**Directions.**—The highest round hill over the west side of the port kept open to southwestward of the eastern entrance point, bearing about 320°, leads southwestward of the rock.

**Outer anchorage.**—As a general rule good holding ground is not found outside Balaklava in less than 25 fathoms (7.6 m.), in which and in deeper water the bottom is a tenacious sand. Vessels sometimes anchor near Balaklava Rock for shallower water. In doing so approach the white streak on the cliff bearing eastward of 43°, to avoid the rock.

**Inner anchorage.**—The anchorage is abreast the town, midway between the two shores, and in a depth of 7 fathoms (12.8 m.), muddy bottom. A vessel anchored here is sheltered from all winds, but in bad weather entrance to the harbor is sometimes difficult.

**Directions.**—A steam vessel should keep in mid-channel and proceed at a moderate speed, as the turns are very sharp.

A sailing vessel entering must be prepared to work quickly, as the space is very limited, and should have her boats ready to take her in tow, as the wind often fails when within the entrance.

With southwesterly winds violent squalls descend from the hills at the first bend.

Vessels usually get under way in the morning before sunrise, with the land breeze, which they carry for 5 or 6 miles. A good berth should be given to Cape Aiya to avoid being becalmed under its cliffs.

**BALAKLAVA.**—The town of Balaklava stands on the eastern shore and is fronted by a stone quay with short piers in places for accommodating small craft alongside. The streets are paved and the town is lighted by electricity. Population about 4,500.

**Supplies** of provisions are readily obtainable, and there is a good water supply.

**Communication.**—There is a good road connecting Balaklava with Sevastopol and Yalta, and there is telegraph and telephone communication with Sevastopol.

**Hospital.**—There is a hospital in the town.

**Cape Aiya** (*44° 25′ N., 33° 39′ E.*).—The coast from the entrance to Balaklava curves to the southward, its appearance being that of a long wall of gigantic rocks about 1,500 feet (457.2 m.) in height, with a flat and wooded surface, the perpendicular extremity of which is Cape Aiya, remarkable for its height, 1,820 feet (554.7 m.), steepness, and reddish appearance. When to the northwestward of Sevastopol Cape Aiya is to be seen over the intervening lowland. See Appendix IX, views K and L.

The shore is fringed by rocks in places to a short distance and should not be approached too closely.

A sailing vessel should give Cape Aiya a wide berth, as, although the water is deep close in, the winds are most baffling under this high, cliffy coast.

**Landmarks.**—Northward of Cape Aiya (about 2 miles), on a promontory with a precipitous triangular bluff, two white patches are painted. The northern one is a vertical white stripe 7 feet long, with its lower end 21 feet (6.4 m.) above the sea; the second or southern patch is a white square, 4¾ feet in extent, at a height of 42 feet (12.8 m.) on the same bluff (not charted).

**Anchorage.**—Vessels sometimes anchor in the bend of the coast at about 2 miles southeast of Balaklava, and they may also shelter themselves under Cape Aiya during violent easterly winds, where it will be quite calm, but they will be drifted to the westward by the current, and sudden squalls sometimes come down through the narrow openings of the mountains near Balaklava.

**Lapsi Bay.**—Between Cape Aiya and Sarich Point, 4 miles, the coast bends to the eastward and forms the little bay of Laspi, at the foot of some high mountains, which affords a good anchorage sheltered from west, round by north to southeast, and is much frequented by vessels seeking shelter from the easterly winds which often prevail off the coast, especially in the winter months. The shore is foul to a short distance. There are fishing huts on the beach at its head.

The most sheltered anchorage is about 500 yards from the shore in 10 fathoms (18.3 m.), abreast of the small headland on the eastern shore, on which stands the coast guard station, a white house on a small hill. Coasters loading at this place approach nearer the shore at the head of the bay and moor in about 4 fathoms (7.3 m.) over a muddy bottom, which shelves very much from the shore. It is said that at this anchorage the westerly winds seldom blow home. However, those from south-southwest are generally considered dangerous, and a coaster must have good, strong hawsers made fast to the shore to secure her against the strong northeasterly winds, which sweep down the hills with great violence. The coast from Laspi Bay to Sarich Point is safe to approach, and at Kapkane a clear spring of water is found near the shore.

**Sarich Point,** the most southern projection of Krimea, is of moderate height and bordered by bold and pointed rocks and a rocky bank of sunken rocks extending 300 yards to the southward, where lies a rock about the size of a boat, named Sarich Rock, which is often passed unnoticed, while at other times it assumes the appearance of a formidable projection. When making Sarich Point on a northerly course and the hilltops are covered the most recognizable feature is the bold headland of Cape Aiya. There is a white house below and slightly to the eastward of the headland, which would probably be seen before Sarich Point Lighthouse, which is difficult to distinguish from a distance. See Appendix IX, views M and N.

In clear weather Mount Laspi, 2,226 feet (678.4 m.) high, situated northward of Sarich Point, which has a small peak and is seen on the sky line, is very conspicuous.

**Sarich Point Light,** alternating fixed and flashing white, with white and red flashes, 125 feet (38.1 m.) above the sea, visible 17 miles, is shown from a white cylindrical iron tower, near keeper's dwelling, 41 feet (12.5 m.) in height, situated on Sarich Point. (See Light List.)

**Coast.**—The southern coast of the Krimea from Cape Khersonese to Yalta is backed by table-lands of bold rocks almost washed by the sea, and from Yalta to Cape Meganom by mountains of less uniform height, their bases being removed farther from the water's edge.

The most conspicuous object on the coast is Foros Church, situated inland on a high detached rock about 2 miles eastward of Sarich Point. Near St. Nikolaya Point are two large two-storied houses and several smaller ones, and the coast to the eastward is dotted with several houses and palaces.

The coast from Sarich Point to Cape Aitodor is bold to approach, with several little inlets which afford shelter for coasters with westerly winds, and in the fine season they are protected from those blowing at sea by the mountains on the coast. A depth of 9 fathoms (16.5 m.) will be found 200 yards from the shore, and 22 fathoms (40.2 m.) at about ⅔ mile distant. Care is, however, necessary to guard against the sudden squalls to which some parts of this coast are subject.

**Cape Kikeneiz,** which bears east 10 miles from Sarich Point, is a low and rocky projection only recognized when running close to the coast. It is bordered by a few rocks, but they lie close to the shore.

**Coast.**—From Cape Kikeneiz the coast trends east by north for about 6½ miles to Cape Aitodor which may be recognized by its lighthouse, and forms a projection between them called Cape Ilmen, lying 2¼ miles from Cape Kikeneiz. Between Cape Kikeneiz and Cape Ilmen several large rocks point out the anchorage near the village of Simeis, where vessels lie sheltered from westerly winds in about 3 fathoms (5.5 m.) very near the shore, abreast of a beach on which are some houses and stores.

At Novi Simeis health resort, close to the sea, is a long two-storied building with balconies, named the Dolnik Pensions. There is a boat pier at Stari Simeis.

About 1 mile eastward of Cape Ilmen is the village of Alupka, standing at the base of the angle of Mount Ay Petri, a steep, flat, rocky hill 4,046 feet (1,233.2 m.) high, which turns suddenly to the northward. This mountain is conspicuous by its light color and by its southern dip down to the sea. The village may be easily recognized by a palace of considerable size, built of gray stone, a church having the appearance of a Greek temple, a pretty mosque, and other buildings surrounded with trees. On the heights between Alupka and Cape Aitodor and near Mount Ay Petri are several beautiful dwelling houses, and on the shore an estate named Miskhor; eastward of this is the village of Koreiz, conspicuous from seaward.

Small vessels can anchor between Miskhor estate and Cape Aitodor in a little cove in 4 fathoms (7.3 m.) about 150 yards from the shore, abreast of the last trees in the Miskhor garden and sheltered from the westward.

Vessels can anchor off Alupka in 20 fathoms (36.6 m.), mud, abreast the pavilion on the beach.

**Telegraph.**—There is a telegraph station at Alupka.

**Cape Aitodor,** the round extremity of a long, slightly inclined tract of land bordered by limestone rocks, 311 feet (94.8 m.) in height, is bold to approach. Within it the Yala Mountains attain a height of 4,046 feet (1,233.2 m.). Mount Jaman, north of the cape, is 4,165 feet (1,269.5 m.) in height. See Appendix IX, views O and P.

There is landing for boats in a small cove about ½ mile eastward of the lighthouse.

**Landmark.**—A white triangle is painted, with its base 21 feet (6.4 m.) above the sea, with sides 28 feet (8.5 m.) in length, on the cliff 600 yards to the westward of the cape.

**Cape Aitodor Light,** fixed white, 315 feet (96 m.) above the sea, visible 24 miles, is shown from a yellow octagonal stone tower with gray lantern, 51 feet (15.4 m.) in height, situated on Cape Aitodor.

**Fog signal.**—A fog signal is made by a bell.

**Caution.**—The height of this fog signal and the nature of its sound render it probable that it will be often inaudible to vessels approaching the cape.

**Signal station.**—A telegraph station annexed to the lighthouse transmits messages signaled from vessels by the International Code. Replies are not signaled to vessels.

**Coast.**—From Cape Aitodor the coast trends northward for 4½ miles to the town of Yalta, whence it trends eastward for about 4 miles to Nikitin Point, distant 7½ miles from Cape Aitodor, forming between them Yalta Road. Between lies the white palace and the palace buildings of the former Czar at Livadiya. Rocks skirt the coast near Livadiya.

**Buoys.**—**Rocks** exists close inshore in places between Cape Aitodor and Yalta; otherwise it is fairly steep-to. Small white can buoys are placed at 1 and 2 miles southward of the breakwater lights, as charted.

**YALTA ROAD** (*44° 29′ N., 34° 11′ E.*) is frequented by vessels meeting with northeasterly winds when bound to Theodosia or Kertch Strait. It is open from east to south-southwest, but although the winds from seaward rarely blow with any strength, the sea often rolls in with great violence and vessels have been wrecked during the autumn months. It sometimes blows hard from the northwest.

**Landmarks.**—The white houses and the church of the old town of Yalta, with white square tower and dome, are visible a long distance seaward.

**Lights.**—A fixed and flashing red light, 36 feet (11 m.) above the sea, is shown from a white tower 34 feet (10.4 m.) in height situated on the southern extremity of the breakwater. (See Light List.)

Two vertical green lights, 32 feet (9.8 m.) above the sea, visible 11 miles, are shown from an iron post 26 feet (7.9 m.) high situated on the spur extending westward from the end of the breakwater.

**A fog signal** is made on a siren at the lighthouse at the southern end of the breakwater.

**Buoy.**—A red spar buoy with inverted cone marks the shoal extending from the western shore of the bay at the entrance to the harbor.

**Anchorage.**—There is anchorage about ½ mile southeast of the town in about 10 fathoms (18.3 m.), sand and mud bottom; nearer the shore the bottom is sand.

The water in the anchorage is reported to be deeper than is shown on the charts.

**Harbor.**—A breakwater 700 yards in length, with a short spur at its outer end, protects the harbor of Yalta. The inner portion, as far as the slight elbow in it, is known as the old mole, and has depths of 22 to 23 feet (6.7 to 7 m.) alongside; the outer half is known as the new mole, and has depths of 23 to 31 feet (7 to 9.4 m.) alongside, the greater depth being at the outer end, where there is a spur extending 70 feet across the entrance.

Owing to the gravel, sand, etc., brought down by the Derekoiskaya River, which flows into the head of the port, and the absence of dredging, the northern part of the harbor has much silted. The depth in the center of the harbor (1922) is about 22 feet (6.7 m.), and alongside the breakwater quays the depth is about 26 feet (7.9 m.).

Sailing vessels moor off the shallower quays, with a stern hawser to the quays. Vessels in the harbor must proceed at slow speed.

There is one mooring buoy in the harbor.

The harbor limits extend southward to the mouth of the Uchan Su.

Masters of vessels should acquaint themselves with the port regulations.

**Winds.**—The strongest winds are those from the northwest, which blow in violent squalls from the mountains, rendering it difficult for vessels to go alongside or to leave the breakwater; but they are rare, only about 30 days in the year. Winds from the southwest blow for about 20 days in the year, and south winds for about 12 days. Westerly winds blow about 50 days in the year. It is reported that winds continuing to blow after sunset will continue the following day, but should they die down before sunset it will be calm.

The heaviest sea comes from east-southeast, and it starts from the Anatolian coast, some 170 miles distant. The most frequent sea, especially in the winter, is from east to east-northeast, but in some years a swell from the southeast quarter has been observed to prevail for the greater part of the year. In Yalta Bay it may be said generally the sea is calm for about 100 days during the year.

**Storm signals** are shown from an iron mast at the bend of the breakwater.

**Ice.**—The harbor never freezes.

**Current.**—An appreciable current has been experienced at the anchorage.

**Lifeboat.**—A lifeboat is stationed at Yalta.

**YALTA.**—The old town of Yalta stands at the entrance of a beautiful valley, in proximity to the finest scenery on the coast.

The slopes of the hills are covered with fir trees, which lower down changes to foliage: the plain consists almost of a continuous garden of cypresses, poplars, laurels, and magnolias, with country houses surrounded by gardens.

The new town, on the western shore of the harbor, contains all the commercial life of the port and the health resort; most of the houses are surrounded by gardens.

South of Yalta is the Livadiya Palace estate.

The permanent population of Yalta in 1913 was about 25,000, largely increased in the summer season by visitors.

**Quays.**—In addition to the old mole and the new mole, which are part of the breakwater, there are at the head of the harbor and on the western side quays with depths varying from 16 feet (4.9 m.) at the quay next to the inner end of the old mole, known as the old quay, to about 5 feet (1.5 m.) at those on the western shore.

A railway extends the whole length of the breakwater.

The port is lighted by electricity.

**Supplies.**—Water from hydrants alongside the old mole. Provisions plentiful and cheap. Small craft are hauled up for repairs on a slip 105 feet long.

**Trade.**—Exports, wine, fruits, and tobacco leaf. Imports, buiding materials, coal, food, fodder, manufactured goods, and articles of luxury.

**Communication.**—Regular steamers all the year to Black Sea ports, and in summer to the Sea of Azov. Good road to Alushta and Sevastopol, and motor cars much used. Telegraph station.

**Hospital.**—There is a hospital.

**Gurzuf.**—Nikitin Point (*44° 30′ N., 34° 15′ E.*), 4 miles eastward of Yalta, consists of a narrow shingle beach, above which the shore rises steeply and is covered with houses and gardens. The Government botanical gardens are situated on an elevation near this point; one of them has pointed turrets. Above them is the village of Nikita, and above it again to the westward are the spires of the palace in Verkhmyaya Massandra.

Rocks fringe the point and extend 150 yards from the shore. Thence the coast takes a northerly direction for 2½ miles to the village of Gurzuf, and then curves 3 miles to the eastward to Cape Ayu Dagh. The houses of the village stand one above the other in the form of terraces on the western side of a high rock on the seashore, on which are the remains of an old fort.

There is a post and telegraph office at Gurzuf.

**Anchorage.**—The best anchorage is in 15 fathoms (27.4 m.) sand and mud bottom, with the church bearing 327°; nearer the shore there is anchorage in about 8 fathoms (14.6 m.), over sand and mud, ½ mile south-southeast of the village. There is good anchorage ¼ mile from the shore in about 6 and 7 fathoms (11 to 12.8 m.) water, between the village and Adalar Rocks, 170 feet (51.8 m.) in height, which lie ¾ mile to the eastward of it and 600 yards to the southward of a white point. Small craft also anchor off the shore between the point projecting from the high rock mentioned above and the church, and make fast to the rocks off the point. Adalar Rocks are steep-to, having a rock with less than 6 feet (1.8 m.) of water between them, and 4 to 5 fathoms (7.3 to 9.1 m.) between the inner one and the white point.

Between Adalar Rocks and Cape Ayu Dagh the shore bends to the northward, forming a cove called Kiziltash, which is safe and deep. A vessel loading here with granite for the works of Sevastopol suffered no injury from a southwesterly wind when it was blowing hard in the offing.

**Cape Ayu Dagh** (*44° 33′ N., 34° 21′ E.*), although much lower than the other mountains on the coast, is still remarkable both from its form and color. Seen from the sea its appearance is that of an island with a round surface, but when close inshore and approaching it either from the eastward or westward it is easy to perceive the form from which it has derived its name, namely, that of a bear lying down. Its summit is covered with trees and its perpendicular shores may be approached without danger, the water being deep all round.

**Current.**—The usual westerly current is felt at its greatest force near this cape.

**Cape Plaka.**—From Cape Ayu Dagh the coast trends north-northeast for 2¾ miles to Cape Plaka, which is a bluff projecting to the eastward, rising in a conical form to 200 feet (61 m.) above the sea, and which may be recognized by a white square tower which stands on its summit. It is bordered by rocks, some of which are visible, and must be given a berth of ½ mile. The coast between forms a bay, in which are the villages of Partenit and Kuchuk Lambat. The former lies 1½ miles to the northward of Ayu Dagh and has a beach with a brook flowing through it. Kuchuk Lambat stands in the bend of the coast within Cape Plaka and is remarkable for its pretty houses.

**Bolgator Cliff,** 1,365 feet (416.1 m.) high, barren, precipitous, and rectangular, which rises to its highest point above the village of Buyuk Lambat, forms an excellent mark for fixing position when between Ayu Dagh and Alushta.

**Anchorage.**—The roadstead abreast of Kuchuk Lambat village is in great repute among the native coasters. Vessels generally anchor in 10 to 12 fathoms (18.3 to 21.9 m.) at 400 or 600 yards from the shore, but small vessels may anchor close in, with their anchors laid out to the southeast and southwest and their sterns secured with hawsers to the rocks bordering Cape Plaka to the westward, which form a kind of jetty sheltering them from the east-southeastward, but they are exposed to all winds between southeast and south-southwest. The southwest wind often blows with violence through an opening formed by the Ayu Dagh and the other mountains.

**Aspect—Mount Kastel.**—Between Cape Ayu Dagh and Cape Meganom, situated 35 miles east-northeastward, the coast recedes, forming a slight bay, the shore of which is safe to approach. About 3 miles to the northward of Cape Plaka is Mount Kastel, 1,500 feet (45.7 m.) high, over Kamish Point, covered with trees and conspicuous.

**Chatir Dagh.**—The village of Alushta, 2½ miles northward of Mount Kastel, stands at the entrance of an extensive valley at the head of which rises Chatir Dagh to the height of 4,970 feet (1,514.9 m.) above the sea, 6 miles from the coast. From the southeastward it appears as a blunt cone. This mountain, the highest in the Krimea, is remarkable by its form and from its being isolated from the chain of mountains which it overtops. Mount Demirdzhi, 3,990 feet (121.6 m.) high, with a summit of perpendicular rocks, lies 6 miles northeastward of Chatir Dagh.

**Alushta Light** (*44° 41′ N., 34° 23′ E.*), alternating white and red, 60 feet (18.3 m.), visible 6 miles, is shown from a red hut on pillars, 26 feet (7.9 m.) in height, situated close to Alushta coast guard station. (See Light List.)

**Fog signal.**—An occasional fog signal is made by a horn.

**Anchorage.**—There is anchorage abreast Alushta Fort, which stands near the village, at ½ mile from the shore in about 12 fathoms (21.9 m.), over a muddy bottom; but this roadstead is open to all winds from east-northeast round by south to south-southwest, and heavy squalls rush down from the mountains.

**Mooring buoy.**—There is a mooring buoy in 21 feet (6.4 m.) northeastward of the pier.

**ALUSHTA.**—The town of Alushta is situated on the foothills of Chatir Dagh in an open situation between two picturesque valleys along which flow two mountain streams; it has two quarters, the Russian and the Tartar.

**Pier.**—Southward of Alushta Light and coast guard station there is a pier 315 feet in length, with a depth of 13 to 14 feet (4 to 4.3 m.) at its head.

**Supplies.**—Provisions and water are obtainable.

**Communication** by steamer as at Yalta, but, owing to bad weather which occurs in winter, the steamers frequently pass Alushta without calling. Post and telegraph office.

**Coast—Roadsteads.**—About 5, 7, 8, 13, and 19 miles, respectively, northeastward of Alushta are the open roadsteads of Miliya Uzen, Sotera, Kuru Uzen, Tuak, Uskyut, and Kapskhor, which are more or less exposed to winds between east through south to southwest. The bottom, however, affords good holding ground. There are coast guard stations at Kuru Uzen, and Tuak. Ai Foka Point, at 1½ miles eastward of Kapskhor, is dark and steep-to. About 3 miles to the westward of Kapskhor the coast forms a little projection named Choban Kale, on which stands a ruined tower, with a coast guard station below it.

**SUDAK BAY.**—About 7 miles eastward of Choban Kale are three other projections, named Chiken, Khoba, and Chekenin Points, and thence the coast recedes northward, forming between the latter point and Cape Meganom a bight about 5 miles across, of which Sudak Bay, westward of Alchak Point (*44° 50′ N., 34° 59′ E.*), is the western portion. Sokol Hill, steep and conspicuous, rises from the coast 1 mile eastward of Chekenin Point, and 1 mile farther eastward is Sudak Point, a steep rock with a tower on its summit and others on its sides, at the entrance to a deep valley. Eastward of Sudak Point is Kutlak Ravine and River, with a coast guard station on the eastern side of its mouth, clearly visible. On the shore between the steamboat piers and Alchak Point are a number of villas and pensions.

In the western part of this bay, westward of Sokol Hill, at a short distance inland, is a country residence consisting of four three-storied white buildings in the form of towers, situated at the corners of a square connected by walls, surrounded by vineyards.

**Sudak Light,** alternating white and green, 46 feet (14 m.) above the sea, visibilities 6 and 3 miles, respectively, is shown from a yellow hut on pillars, 20 feet (6.1 m.) in height, situated at the head of Sudak Bay. (See Light List.)

**Pier lights.**—Occasional lights are shown from the piers. These lights are more powerful than Sudak Light.

**Anchorages.**—There is anchorage in 10 to 11 fathoms (18.3 to 20.1 m.), over a muddy bottom, about ½ mile from the shore, with Alchak Point bearing 95° and Sudak Church 5°. This is preferable to any other berth in the bight, as it is a good position from which to get under way.

The bight next eastward, between Alchak Point and Cape Meganom, affords anchorage in depths of 12 to 13 fathoms (21.9 to 23.8 m.), sand and mud bottom; vessels lie here comfortably with winds from northeast to east.

Small vessels can obtain shelter from southwesterly and westerly winds in the bight eastward of Chekenin Point, where the depths are from 9 to 4 fathoms (16.5 to 7.3 m.), sandy bottom.

**Life-saving station.**—There is a life-saving station with rocket apparatus near Sudak Point.

**SUDAK** is situated 1 mile from the shore on the west side of the valley through which the Taraktash Rivulet flows; it is only partially visible from the anchorage.

It is the administrative center of the whole of the district.

Population about 2,000 permanently, but increased during the summer months.

The climate is equable and mild, even in winter, the bay being only open to the southward.

**Piers.**—There are two landing piers in the bay, belonging to the two Russian companies whose steamers trade there. The same companies have mooring buoys in 4½ to 5 fathoms (8.2 to 9.1 m.).

**Supplies.**—Vessels may obtain water at the rivulet, where boats can go right in. Vegetables are obtainable at the town.

**Trade.**—Wine is the principal article of trade.

**Communication.**—Steamers between Theodosia and Alushta call here several times a week. Telegraph station and post office.

**Hospital.**—There is a hospital with 12 beds.

**Cape Meganom** (*44° 48′ N., 35° 05′ E.*) is the eastern extremity of the arid promontory of which Kilse Burnu is the western, 1½ miles apart, above which is Mount Ardich Kaya, 1,155 feet (352 m.) in height. The two points are bold to approach, with a depth of 15 to 20 fathoms (27.4 to 36.6 m.) at ½ mile off. See Appendix IX, view Q.

**Cape Meganom Light,** fixed and flashing white, 324 feet (98.8 m.) above the sea, flashing light visible 25 miles, fixed light visible 16 miles, is shown from a white octagonal masonry tower 51 feet (15.5 m.) in height situated on Choban Basti Point, Cape Meganom. (See Light List.)

**A fog signal** is made on a bell at the lighthouse.

**Coast.**—After rounding Cape Meganom the last great rocks of the Krimea will be seen to the northeastward over the coast, named Kara Dagh, 1,890 feet (576.1 m.) high, beyond which the country is more level. The cape below Kara Dagh is high, with an irregular surface of rocks resembling towers and with deep water around it. At its foot to the westward lies the village of Otuz, through which the river of the same name discharges and off which there is anchorage in about 12 fathoms (21.9 m.), bottom mud and shells.

**Eski Dagh,** situated 5½ miles westward of Kara Dagh, is 2,100 feet (640.1 m.) in height and has three summits. The center and highest has the form of a truncated cone and is covered with wood; the others are pointed and bare. This mountain, like Kara Dagh, is visible about 40 miles and is a good landmark.

**Koktebel Bay.**—From Kara Dagh the coast continues northeastward for 3 miles, and then runs to the eastward for about 5 miles to Cape Kiik Atlama, forming the picturesque little bay of Koktebel at the foot of the valley of that name. It affords excellent anchorage, but is open to the south and southeast. The eastern side of the bay is formed by a narrow point projecting ½ mile to the southward, to the eastward of which, a little distance from the shore, will be seen two white rocks like boats under sail. Westward of Cape Kiik Atlama is a group of important factories.

**Cape Kiik Atlama** projcets to the southeast, and its extremity is formed by a little hill with steep sides, which being united to the coast by a low isthmus, gives it the appearance of an island when seen at any distance. On its summit is a semaphore, by which it may be distinguished from Cape St. Elias, 4 miles to the northward, when approaching Theodosia. Ivan Baba, a rock lying close to its northeast extremity, has the appearance of an inaccessible islet. On this rock is a stone chapel. The point is steep-to.

Cape Meganom Light kept in sight until Cape St. Eli Light is well in sight leads to Cape Kiik Atlama.

**Dvuyakornaya Bay.**—From Cape Kiik Atlama the coast falls back 2 miles to the westward, forming Dvuyakornaya Bay.

From the inner end of Cape Kiik Atlama, a range of fairly high hills extends to the northwestward, and almost parallel to it, extending within Cape St. Eli, is another range; between these ranges is a valley whose mouth rests on the shore of Dvuyakornaya Bay, where there is a coast guard station and the remains of Dvuyakornaya battery.

It is open from northeast round by east to south-southeast, and has depths of 7 to 14 fathoms (12.8 to 25.6 m.), over a mud bottom, at from ¼ to ¾ mile from the shore, which is bordered in some places by ridges of rock close to the coast.

A small cove, situated about ¾ mile to the westward of Cape Kiik Atlama, is about ½ mile wide and ⅓ mile long, and has from 6 to 7 fathoms (11 to 12.8 m.) at its entrance, over sand and mud, and 3 to 4 fathoms (5.5 to 7.3 m.) at less than 200 yards from its head. The northeast wind blows right into it.

**Torpedo practice.**—There is a torpedo station in the bay, with extensive workshops, accommodation school, hospital, etc., for the workmen; connected with Theodosia by telegraph. Torpedo practice takes place periodically in Dvuyakornaya Bay, the area closed to navigation being marked by seven buoys with red flags. When firing is proceeding a black ball is hoisted on a white mast near Cape St. Eli Lighthouse, and a red disk is shown at a height of 620 feet (189 m.) from a white framework structure on Cape Kiik Atlama.

**Cape St. Eli** (*40° 01′ N., 35° 26′ E.*), at the western end of the Gulf of Theodosia, is a high and bluff point. Some rocks border the cape, but a depth of 4 fathoms (7.3 m.) will be found at a distance of about 200 yards from it, and 10 fathoms (18.3 m.) at ½ mile. Shoal water also extends in a northerly direction from Theodosia Point for 450 yards, where there is a depth of 3½ fathoms (6.4 m.). A small white chapel, dedicated to St. Eli, stands on an elevation of about 400 feet (121.9 m.) ⅔ mile to the westward of the cape and may be recognized from a long distance.

**Cape St. Eli Light,** alternating white and green, visible 20 and 10 miles, respectively, 216 feet (65.8 m.) above the sea, is shown from a white hut on pillars, 36 feet (11 m.) in height, situated on the south slope of the cape. (See Light List.)

**A fog signal** is made by a siren.

**GULF OF THEODOSIA,** between that point and Cape Chauda, 17 miles to the eastward of it, is formed by the coast receding nearly 8 miles to the northward. It has convenient depths of 10 to 15 fathoms (18.3 to 27.4 m.) all over it and 5 fathoms (9.1 m.) within 1 mile of its shores, which are safe to approach.

**Landmarks.**—On rounding Cape St. Eli to proceed to the anchorage off Theodosia the most conspicuous objects are the East Mole Lighthouse; a large white square tower at the northern end of the tower near the Tuplinski Monastery; a large building with copper dome near by; and a white wall at the eastern part of the town, which is very conspicuous. The cathedral and Georgievsk Monastery, which stand back from the sea, can be distinguished by their copper domes, and in the evening the masts of a radio station about 1 mile northward of the town show up very clearly from the anchorage.

**Lights.**—A fixed white light with red sector, 43 feet (13.1 m.) above the sea, is shown from a cylindrical white iron tower 38 feet (11.6 m.) in height situated on the end of the east mole.

Two vertical fixed white lights, 31 feet (9.4 m.) above the sea, are shown from a white iron post 24 feet (7.3 m.) in height situated at the north angle of the head of the broad western mole.

Two vertical lights like those above mentioned are shown from the south angle of the head of the same mole.

A light is shown from the Russian Steam Navigation Co.'s pier when vessels of that line are expected. The quays are lighted by electric light from sunset to 11 p. m.

**A fog signal** is made by a bell from the eastern pierhead.

**Theodosia Roadstead.**—The roadstead abreast the town has good holding ground, and it is sheltered from all winds except those from eastward. These winds send in a heavy swell, which, however, is attended with but little danger. The usual anchorage is to the northeastward of the eastern pierhead in a depth of 8 fathoms (14.6 m.), the bottom consisting of mud with sand and shells. Vessels may anchor anywhere. It is necessary to sight the anchors occasionally if making any stay, as owing to the tenacious bottom it becomes difficult to weigh them.

Vessels in quarantine anchor off the quarantine station.

**Commercial harbor.**—There is an artificial harbor formed by two moles at Theodosia, having an area of about 26 acres and dredged to a depth of 24 feet (7.3 m.), excepting in its southeast corner, where the depth is 19 feet (5.8 m.); alongside the northern side of the western mole the bottom has been dredged to a depth of from 25 to 28 feet (7.6 to 8.5 m.).

The eastern or protective mole is 2,044 feet in length, with a width of 21 feet; the upper part is 11 feet (3.4 m.) above sea level and the parapet 16 feet (4.9 m.); the head of the mole is 42 feet wide.

The western or broad mole is 910 feet long on the inner side and 1,449 feet on the outer, with a width of 350 feet, and shelters the harbor from the northward.

The northwestern quay, at the inner end of the western mole, serves for berthing foreign steamers to a maximum draft of 26 feet.

There is a pier 462 feet long in the south part of the harbor, and there is also a smaller pier.

**Regulations.**—All merchant vessels arriving in the port will be assigned a berth in order of arrival.

Vessels lying alongside the quays must exhibit stay lights from sunset to sunrise, and show a light at its gangway to the quay.

Vessels are not to anchor in the fairway of the harbor and roads.

Vessels having less than 1½ feet under their keel are forbidden to enter the harbor.

Vessels with explosives are not allowed to enter.

Vessels entering must give way to those leaving the port.

Vessels must proceed at slow speed.

When approaching a dredger a vessel must slow down and sound a prolonged blast on her siren. The dredger will show on the side which is clear two balls or two white lights, placed vertically.

Vessels are not allowed to enter the harbor except after having obtained permission from the port authorities.

NOTE.—Masters of vessels are advised to obtain a complete copy of the regulations on arrival.

**Storm signals** are hoisted at the lighthouse and on the tower in connection with the hydrometeorological station at the shore end of the western mole; the tower is of wood and yellow. Its summit is 60 feet (18.3 m.) above the ground and 67 feet (20.4 m.) above the sea. See page —.

**Lifeboat.**—There is a lifeboat stationed at the harbor.

**Pilots.**—Pilotage is not compulsory.

**Directions.**—After passing Cape St. Eli and Theodosia Point, to which a berth of 600 yards should be given, a sailing vessel with a southerly wind should immediately haul up for the anchorage, as squalls are frequent from the mountains above the town.

**THEODOSIA** (*45° 02′ N., 35° 24′ E.*).—The town of Theodosia, the ancient Kaffa of the Genoese, formerly the largest and most important in the Krimea, is located at the western side of the Gulf of Theodosia, partly on the low shore and partly on the rising ground within. Although prettily situated, as a resort it is not considered so attractive as Yalta. The streets and squares are paved, and the main streets as well as the harbor are lighted by electricity.

It has become the commercial port of the Krimea instead of Sevastopol, and in 1913 had a population of 27,236.

The situation of the port on the shore of a sea which never freezes admits of its serving for the winter export of the grain produce of South Russia when the Azov ports, toward which this produce is attracted, are blocked with ice. It also serves in winter as a point of transit for the Black Sea-Caucasus and trans-Caucasus direct goods communication, and the port for the importation of foreign articles, which are brought mainly to southern Russia.

**Quayage.**—The length of the quayage is 1,350 yards. The northwestern quay, at the inner end of the western mole, serves for berthing foreign steamers to a maximum draft of 26 feet.

There is a pier 462 feet long in the south part of the harbor, and there is also a smaller pier.

On the town quays there are about 26 warehouses equipped for the grain trade. Railroad lines extend to all quays.

**Coal and supplies.**—About 1,000 tons of coal are usually in stock, besides that of the Government. (None, 1920.) Coaling is carried out by means of lighters or alongside the quays, where there is a depth of 23 feet (7 m.). About 500 tons in the port and 250 tons in the roadstead can be put on board in the day.

Meat and bread are plentiful. Vegetables are plentiful on market days (Thursday and Sunday), but scarcer on other days. The bay abounds with fish.

The supply of fresh water is from a hydrant in the town, but is limited, especially in the summer months, when it barely suffices for local requirements.

**Trade.**—The port is principally occupied in the export of wheat, barley, and other grain, amounting to about 3,000,000 tons. Vine culture, wine making, and the fishing industry are the main occupations of the inhabitants.

**Communication.**—Steamers between Odessa, Kertch, Batum, and intermediate ports call several times a week. Theodosia also is connected to the Russian railroad system by a branch from the Dzhankoi station on the Kertch-Sevastopol Railroad and also with Kertch. Telegraphic communication with all parts.

**Meteorological station.**—There is a well-equipped hydrometeorological station at Theodosia, which issues weather reports for the benefit of mariners and others.

**Quarantine.**—Theodosia is a quarantine station for vessels coming from infected ports and bound for Russian ports in the Black Sea.

The quarantine buildings are situated at the eastern end of the town and are in the old Genoese fortress, several towers of which are still standing.

**Coast.**—From the coast guard station northward of Theodosia the coast is low and sandy for a distance of 1½ miles, whence it becomes more elevated near Koronelya villa and is bluff, beginning from the village of Malie Kamishi, thence turning eastward and southeastward to Cape Chauda. The shore is barren. There are only two settlements near the shore, namely, Malie Kamishi and Zitengerovka (Sidzheut), 7 miles apart; from the latter village to Cape Chauda the coast is quite a desert. There are no dangers and the coast may be safely approached by the lead.

**Cape Chauda** (*45° 00′ N., 35° 51′ E.*) is bordered on its western side by some rocks lying close to the shore, while the point northwest of it has a reef. In approaching from the westward the cape may be recognized by its lighthouse and a round hill, called Mount Dyurmen, which appears connected with it, although lying 5 miles to the eastward. A Tartar village named Karangat stands near Mount Dyurmen, southward of which the coast projects and forms the little point of Dyurmen. Between Cape Chauda and Dyurmen Point foul ground extends nearly 1 mile from the shore. When eastward of Dyurmen Point Kinchigar Hill, 378 feet (115.2 m.)

high, will be seen, but it is not charted. A village is visible on the eastern slope of that hill.

**Cape Chauda Light,** alternating fixed and flashing red and white. 121 feet (36.9 m.) above the sea, visible 17 miles, is shown from a white quadrangular stone tower, with keeper's dwelling attached, situated about ¼ mile within the extremity of Cape Chauda. (See Light List.)

**Signal station.**—Telegrams signaled by passing vessels are forwarded by telephone from the lighthouse to Theodosia for transmission.

**Wreck.**—A spar showing 2 feet (0.6 m.) above water, believed to be attached to a wreck, lies about 3 miles 122° from Cape Chauda Lighthouse.

**Anchorage.**—There is anchorage in a small inlet to the eastward of Dyurmen Point in 4 fathoms (7.3 m.), over mud and sand, about ½ mile from the shore, sheltered from west-southwest through north to east. From thence the coast again recedes to the northward, and then trends eastward to Mount Opuk, which is 11½ miles eastward of Dyurmen Point.

**Mount Opuk** (*45° 02′ N., 30° 13′ E.*), which rises to a height of 630 feet (192 m.), may be seen at a great distance and is sometimes compared to Gibraltar, although it is much lower. Its summit is flat and covered with rocky projections, which have the appearance of fortifications. Mount Opuk can be rounded very closely, and between it and Elchan Kaya Rocks there are depths of 5 to 7 fathoms (9.1 to 12.8 m.).

The current here runs fairly strong to the southwestward at times, depending on the strength of the easterly wind; off Cape Chauda it has a tendency to set a vessel toward it.

**Anchorage.**—A vessel will find anchorage in 5 to 6 fathoms (9.1 to 11 m.) in the bend of the coast to the eastward of the mount, sheltered from west-southwest through northeast by north.

**Elchan Kaya or Karavi Rocks.**—The three rocks named Elchan or Karavi lie offshore about 2¾ miles 230° from Mount Opuk, and when seen from the southward appear like two vessels and a boat under sail. They are bold close-to, and a sailing vessel may anchor near them in about 9 fathoms (16.5 m.) water, with a mud bottom, when waiting for a favorable wind to enter the Kertch Strait. See Appendix IX. view R.

**Kyz Aul Point.**—From Mount Opuk the coast line, which shows the effects of numerous landslides, is reddish or gray in color and trends to the northward and eastward for 6 miles to Kyz Aul Point.

**Kyz Aul Point Light,** fixed white with red and green sectors, 204 feet (62.2 m.) above the sea, visible 12 miles, is shown from an octagonal stone tower with black and white vertical stripes, 107 feet (32.6 m.) in height, situated on the point.

**Signal station.**—Telegrams communicated by the International Code to the signal station at Kyz Aul Light will be forwarded, payment being made by those to whom they are addressed.

**Storm signals** are also shown from the lighthouse. See page 33.

**Pier.**—Abreast Kyz Aul village is a pier from which iron ore is shipped. Several houses are situated abreast it, while on a hill inland there are several buildings similar to barracks.

**Kyz Aul Shoal.**—A shoal about 1 mile in length and breadth with isolated patches of 6 to 12 feet (1.8 to 3.7 m.) on its eastern and northern edges, extends 1¼ miles southward and southeastward from Kyz Aul Point.

**Spitfire Rock,** with a least depth of 25 feet (7.6 m.) on its northern extremity and depths of 7 to 9 fathoms (12.8 to 16.5 m.) around, lies 142°, distant about 3 miles, from Kyz Aul Lighthouse.

**Directions.**—Cape Chauda Light Tower well open southward of Elchan Kaya Rocks, bearing 270°, leads southward of these shoals, and the light towers on Cape Pavlovski (Paul) in range (lights at night) well open of Cape Takil, bearing 357°, lead eastward of them.

Yenikale Light in sight at night leads eastward of them.

# CHAPTER VII

## KERTCH STRAIT AND SEA OF AZOV

**Kertch Strait—Depths.**—This strait, which unites the Black Sea with the Sea of Azov, is 25 miles in length between its extremities and varies in width from 8 miles at its southern and northern entrances to only ¾ mile in the narrows between Cape Pavlovski and the shallow water off Tuzla Spit. It is much encumbered with shallow banks, but a narrow channel has been dredged through with a least depth of 24 feet (7.3 m.). In 1921 the dredged channel was reported to have silted considerably.

Navigation in the Kertch-Yenikale section is (1925) possible for vessels with a draft not exceeding 23 feet (7 m.).

**Water level.**—Strong northeasterly winds decrease the depths in the strait and southwesterly winds increase them. As much as 2 feet 11 inches has been observed in the difference of levels.

**Depths** in the dredged channel are signaled from the guard ship and from the signal mast at the pilot station at Yenikale.

**Ice** appears in the strait every year, but the annual number of days with ice varies considerably. The earliest appearance of ice took place on December 20, while the latest final clearing was on March 28.

**Currents.**—From observations made at Tuzla Light Vessel, when moored off the southern end of Pavlovski dredged channel, for a period of 10 years (excluding the ice season), the current from the Sea of Azov comprised 46 per cent of the observations, that from the Black Sea 31 per cent, and when no current was observed 23 per cent. The mean rate of the Azov current was 0.59 to 0.92 knots and the Black Sea 0.57 to 0.69, consequently the Azov has the greater rate. In the spring the predominance of the Azov current is more marked, in May being 59 per cent, the Black Sea current 25, while 16 represented the absence of currents. In summer the Azov current weakens, and is at its minimum in September; in November the current from the Black Sea is at its maximum, but both depend more or less on the wind. The greatest rate of the current observed in both directions in the narrowest part of the strait reaches 2½ and even 3 knots, but in the broader parts it is considerably less. In Kertch Bay and Roads the effect of the current is only noticeable by the rise and fall of the water.

After the subsidence of prolonged northeasterly winds the current will be found setting toward the Sea of Azov, and this will continue until the ordinary water level is reestablished.

**Local magnetic disturbance.**—Considerable local disturbance has been reported in Kertch Strait.

**Guard ship.**—A guard ship is stationed in Kertch Roads at about 1½ miles east-northeastward of Ak Burnu.

By day she flies the guard ship flag and by night a white light at the masthead in addition to stay and stern lights. When vessels are required to stop two green lights will be hoisted at the gaff of the guard ship.

**Pilots.**—Pilotage is compulsory for all vessels navigating Kertch Strait. Pilots may be obtained at Tuzla Light Vessel, Kertch, Yenikale, and the guard ship.

Vessels requiring pilots should hoist a signal flag and keep it hoisted until a pilot arrives. In answer to his signal a flag hoisted at the pilot station will indicate that the pilot is on his way to the vessel.

A black ball hoisted instead of a flag indicates that on account of the weather a pilot can not board the vessel. Vessels are not usually piloted by night.

**THE WESTERN SHORE of Kertch Strait,** from Cape Takil to Cape Khroni, will be first described; the description of the eastern shore begins on page 317.

**Cape Takil** (*45° 06′ N., 36° 27′ E.*), 4½ miles northeastward of Kyz Aul Point, is about 270 feet (82.3 m.) in height and forms the southwest extremity of Kertch Strait. The old light tower, painted white with a gray lantern, stands on the summit, and being elevated 330 feet (100.6 m.) above the sea, is a conspicuous day mark.

**Niger Rock.**—Cape Takil is bordered by a reef with depths under 3 fathoms (5.5 m.), commencing at Kyz Aul Lighthouse to the southwestward, and extends at first only 400 yards from the shore, but near Cape Takil runs out in a southeasterly direction for about ¾ mile. Near the eastern edge and 1,200 yards from the shore is Niger Rock, with a depth of less than 6 feet (1.8 m.). A depth of 5 fathoms (9.1 m.) will be found along the edge of the reef, but a vessel not seeing the buoy, which may be adrift, should give Cape Takil a wider berth.

**Buoy.**—A red spar buoy with inverted cone top mark is moored in 5¾ fathoms (10.5 m.) at about ½ mile southeastward of Niger Rock.

**Directions.**—Kamish Burnu white light in sight at night leads eastward of the reef extending from Cape Takil.

**Wrecks—Light buoy.**—A light buoy showing a flashing white light marks a wreck lying about 1¼ miles east of Cape Takil.

Two wrecks lie about 2¾ miles east-northeastward of Cape Takil.

**Coast.**—About ⅔ mile to the northward of Cape Takil, at ½ mile from the shore, is a reef with a depth of 7 feet (2.1 m.), and 5 fathoms (9.1 m.) near its outer edge. To the northward 4 fathoms (7.3 m.) will be found ½ mile from the shore. Another patch with a depth of 6 feet (1.8 m.), steep-to on its outer side, lies nearly ½ mile from the shore 3½ miles north-northwest from Cape Takil and abreast of a cliff between Chongelek Point and the Tobechik coast guard station south of it. Northwestward of this point is an extensive salt lake, which may be seen from the deck of a vessel over the strip of sand dividing it from the sea. Northward of Chongelek Point the coast is free from danger up to Kamish Burnu Bay.

**Kamish Burnu** (*45° 14′ N., 36° 25′ E.*), 91 feet (27.7 m.) high, situated about 8 miles northward of Cape Takil, will be easily recognized. It is the northern termination of the coast hills, and a coast guard station and a mill lie about ½ mile to the southward of it.

From the point the shore is low and sandy, terminating at 2 miles in a low, sandy peninsula about 400 yards wide, bold to approach, having about 18 feet (5.5 m.) water off its northern end 300 yards from the shore. Westward of the peninsula is a lake ¾ mile long north and south, which has a depth of 12 feet (3.7 m.) and communicates with the sea by a narrow and shallow channel, only practicable to small coasting vessels drawing about 5 or 6 feet.

**Tuzla (Tuzlinski) Light Vessel** (*45° 14′ N., 36° 27′ E.*) shows an occulting red light, 35 feet (10.7 m.) above the sea, visible 9 miles, from an iron framework tower surmounted by a black ball, 42 feet (12.8 m.) high. It has a yellow hull, "Tuzlinski" in Russian characters on the sides, and is moored in the approach to Kertch Strait at about 2 miles eastward of Kamish Burnu northern lighthouse.

When the summer aids to navigation are replaced by winter aids the light vessel is withdrawn and her position is marked by a black spar buoy with flag.

**A fog signal** is made by a whistle.

**Pilots** can be obtained from the light vessel.

**Signals** are made from the light vessel when a vessel is seen standing into danger. See Warning signals, page 33.

**Kamish Burnu Range Lights.**—The front light shows two fixed white lights, 112 feet (34.1 m.) above the sea, visible 16 miles, from a white stone octagonal tower 42 feet (12.8 m.) in height, situated on Kamish Burnu.

A fixed green light, 102 feet (31.1 m.) above the sea, visible 16 miles, is shown from the south side of the same tower.

A fixed red light, 164 feet (50 m.) above the sea, visible 19 miles, is shown from a white pyramidal stone tower 35 feet (10.7 m.) in height. This light in range with the front light, bearing 217°, leads through Burunski Channel. (See sketches on chart.)

The rear lighthouse is reported to be inconspicuous from seaward, having the appearance of a white windmill without sails; it may, however, be picked up when in range with the pier southeastward of it, which is black and conspicuous, bearing about 310°.

**Kamish Burnu Bay,** west side of entrance to Kertch Strait, is about 2 miles wide, with depths under 3 fathoms (5.5 m.). The northern shore is a flat hill terminating eastward in Cape Pavlovski. On the hill is the fort flagstaff, and farther westward the light towers with range lights for the approach to Kertch Strait.

The bay has depths of 14 to 18 feet (4.3 to 5.5 m.) and affords anchorage in 2 to 3 fathoms (3.7 to 5.5 m.) at 600 yards from the shore, avoiding a bank of 5 feet (1.5 m.) in the western part of the bay near the head of the jetty. The bay is, however, exposed to northeasterly winds.

**Kamish Range Lights.**—The front light, fixed red, 105 feet (32 m.) above the sea, visible 16 miles, is shown from a white square tower, 38 feet (11.6 m.) in height, situated on the eastern wall of a low white dwelling with a red roof, on the edge of a yellow cliff among the trees at Kamish village. (See sketch on chart.)

The rear light, fixed white, 347 feet (105.8 m.) above the sea, visible 25 miles, is shown from a white square building with flat gabled roof, 39 feet (11.9 m.) in height, situated at Churubash, 5 miles 247° from the front light.

These lights in range, bearing 247°, lead through the Kertch-Yenikale dredged channel in 24 feet (7.3 m.).

The rear lighthouse is situated on the sky line in the middle of a clump of trees and is very conspicuous, being the only break in an otherwise bare sky line. The lighthouse is shut out by intervening hills until a vessel is halfway along the Burunski Channel.

**Cape Pavlovski** (*45° 18′ N.*, *36° 29′ E.*), 5 miles northeast of Kamish Burnu, is of moderate height, with a battery and some buildings on it.

A small harbor is situated on the northern side of the cape.

Kertch Fort, situated on the coast between Cape Pavlovski and Ak Burnu, 1 mile to the northeastward, covers the adjacent heights, which rise 364 feet (110.9 m.) above the level of the sea.

**Pavlovski Range Lights.**—The front light, fixed blue, 224 feet (68.3 m.) above the sea, visible 18 miles, is shown from a white square stone tower 56 feet (17.1 m.) in height, situated on Cape Pavlovski.

The rear light, fixed red, 336 feet (102.4 m.) above the sea, visible 16 miles, is shown from a round red iron tower on skeleton structure, 36 feet (11 m.) in height, situated at a distance of 717 yards 357° from the front light.

These lights in range, bearing 357°, lead through Pavlovski Channel to its junction with Burunski Channel. (See sketches on charts.)

**Beacons.**—A white stone beacon, 28 feet (8.5 m.) high and 291 feet (88.7 m.) above the sea, is situated 250 yards 341° from Pavlovski front lighthouse. This beacon when in range with Cape Pavlovski Lighthouse, bearing 341°, leads over the southwest extremity of Tuzla Bank and of the spoil ground in 18 feet (5.5 m.) within the spar buoys marking that extremity. The water is only about 1 foot (0.3 m.) deeper westward of the buoys, and vessels of 16 feet draft may follow the range line. (See sketch on chart.)

**Lifeboat.**—A life-saving station with lifeboat is situated on the shore near the lighthouse.

**Fog signal.**—A fog signal is made from a fog signal station near the life-saving station.

**Ak Burnu—Bank.**—One mile to the northeastward of Cape Pavlovski is Ak Burnu, remarkable both for its white appearance and its numerous hillocks, on one of which stands a white house visible a long distance. From Cape Pavlovski a flat, with depths of 1 to 2 fathoms (0.3 to 0.6 m.), extends in an easterly direction for about 1½ miles, the extremity of which is about 1,600 yards eastward of Ak Burnu. There are patches of less than 6 feet (1.8 m.) in places on this flat.

**Buoys.**—The southern side of the bank is marked by three buoys, painted in red and white horizontal bands and with inverted cone top marks. The westernmost has three white bands, the next two white bands, and the easternmost one white band.

A red spar buoy with inverted cone top mark is moored on the southern side of a rocky patch with 4 feet (1.2 m.) water, situated about ½ mile southward of Ak Burnu.

A red and white checkered spar buoy surmounted by a red and white checkered flag is moored on the eastern side of the 4-foot (1.2 m.) patch on the 2-fathom (3.7 m.) edge of the flat and at a distance of 1,500 yards from Ak Burnu; a black spar buoy with cone top mark is moored on the western side of the same 4-foot (1.2 m.) patch.

A red spar buoy with inverted cone top mark is moored eastward of a 6-foot (1.8 m.) patch in a depth of 12 feet (3.7 m.) at a distance of 800 yards from Ak Burnu.

The three last-mentioned buoys are for the purpose of shortening the route between the port of Kertch and Tuzla Road for vessels with a draft not exceeding 10 feet.

A red buoy with inverted cone top mark is moored off the eastern extremity of Ak Burnu Shoal; between this buoy and the buoys marking Ak Burnu Shoal is the dredged channel to Kertch.

**Caution.**—In view of the frequent grounding of vessels entering Kertch Strait, mariners are reminded that this bank can not be distinguished by discoloration of the water.

**Telegraph cable.**—A submarine cable has been laid between Ak Burnu and Taman village, situated on the southern shore of Taman Lake. Its track is marked by black and yellow buoys, each surmounted by a black flag. Anchorage in the vicinity of the cable is prohibited.

**KERTCH ROADS OR KERTCH BAY** lies on the north side of the strait, between Ak Burnu and Cape Zmiini; it is nearly 3 miles wide between these points, from which it extends northwestward for about the same distance to its head. The depths are from 14 to 16 feet (4.3 to 4.9 m.) in its entrance, reduced to 10 and 12 feet (3 and 3.7 m.) toward its head, over a bottom of mud so soft that a vessel will not be hurt by touching it.

**Coast—Aspect.**—The southern shore of the bay, westward of Ak Burnu, is formed by the northern slopes of Pavlovski Ridge, which are steep and bluff in places, to ½ mile westward of Ak Burnu. At a short distance westward of the point is a military landing place protected by a mole. Farther westward the slope becomes less, and here is the military quarter.

The western shore is low and sandy; on it may be seen, commencing from the southward, cement works with a pier naphtha works, and engineering works with a pier and slip for repairing vessels, then some salt storehouses, a steam flour mill, the buildings of the Russian Steam Navigation & Trading Co. with piers, and near them the pier of the Russian Co.

The town begins northward of the latter pier; a portion of it is situated on the shore and a portion on the slopes of Mitridat Hill, which has a chapel on its summit. (See view on chart.)

**Cape Zmiini** is a low, cliffy point on which is a Lloyd's flagstaff and lookout hut, but the station has not been operated for many years.

**Buoy.**—The shoals situated about 600 yards eastward of the cape are marked on their southern side by a red spar buoy with inverted cone.

**Pier.**—A little to the westward of the cape is a pier belonging to the metal works, the tall chimneys of which are conspicuous from the strait. The pier has a depth alongside of 13 feet (4 m.), and a channel of the same depth leads to it from the main channel.

**Dredged channel.**—A channel 180 feet wide, with a depth of 18 feet (5.5 m.), has been dredged from abreast the southwestern entrance of the Kertch-Yenikale dredged channel, eastward of Ak Burnu Shoal, beginning in a 340° direction, toward the head of the bay and the new commercial harbor. In 1925 the depth in this channel had decreased to 13½ feet (4.1 m.), and in the basin within the Genoese Mole the depth (1922) was 14 feet (4.3 m.).

**Beacons.**—The dredged channel is marked by black stakes with cone top marks on the starboard hand and red stakes with inverted cone top marks on the port hand.

**Light buoys.**—The bend in the dredged channel, about 1,200 yards eastward of the Genoese mole, is marked by a small red pillar light buoy exhibiting a flashing white light.

A similar buoy exhibiting a flashing white light is situated ½ mile farther to the northwestward in the northern section of the dredged channel.

Both buoys should be left on the port hand when approaching Kertch.

**Kertch Range Lights.**—The front light, fixed green, 95 feet (29 m.) above the sea, is shown from a gray iron framework 48 feet (14.6 m.) in height, situated norteastward of the town.

The rear light, fixed red, 138 feet (42.1 m.) above the sea, is shown from a gray iron framework 63 feet (19.2 m.) in height, situated 1,077 yards 340° from the front light.

These lights in range, 340°, lead through the southern section of the dredged channel.

From the southern end of the channel it is said to be impossible to distinguish either the towers or the range lights.

**Lights.**—Two vertical fixed red lights, 35 feet (10.7 m.) above the sea, visible 11 miles, are shown from a red circular iron tower 32 feet (9.8 m.) in height, situated on the elbow of Genoese Mole.

A flashing green light with red sector, 38 feet (11.6 m.) above the sea, visible 7 miles, is shown from a gray framework tower 29 feet (8.8 m.) in the height, situated on the head of Genoese Mole. (See sketches on chart.)

A fixed red light is shown from the western end of the protective mole of the floating dock basin, northward of Shirikoi Mole.

Two fixed red lights, 13 and 14 feet (4 and 4.3 m.) above the sea, are shown from the Russian Steam Navigation Co.'s pier, situated at the south end of the town. These lights in range, 284°, lead up to the pier.

**Anchorage.**—There is anchorage in Kertch Roadstead for vessels not exceeding from 12 to 13 feet draft, taking a position according to draft. Local craft go alongside their own piers. Small vessels wintering at Kertch anchor near the northern shore of the bay between the Genoese Mole and Karantinni Point. Vessels above 13 feet draft must anchor in Tuzla Road out of the line of traffic; vessels are permitted to load to a draft of 23 feet there.

There is no difficulty in picking up either anchorage, the buoys being numerous, but vessels without local knowledge should be in charge of a pilot.

The quarantine anchorage is between the red buoy off Ak Burnu and the quarantine station. The limit of this anchorage on the side of the town is indicated by spar buoys surmounted by brooms. The quarantine establishment, 1¾ miles to the eastward of the town, on Karantinni Point, is marked by a flagstaff from which the quarantine flag is shown during the day; here are the quarantine buildings.

**Genoese Mole.**—Fronting the center of the town is the Genoese Mole, about 1,400 feet in length, with a narrow arm extending about 1,500 feet northward of its extreme end, both for protecting the space within the mole and Taman Pier and the old piers of the Volga-Don Co. northward of it. From the Genoese Mole the coast, on which stands the northern portion of the town, extends about ½ mile northward, whence it trends eastward, forming the head of the bay, and from thence southeastward to Karantinni Point and beyond it to Cape Zmiini.

**Buoys.**—Two red spar buoys with inverted cone top marks are placed in 12 feet (3.7 m.) to mark a shoal on the south side of the Genoese Mole.

**Commercial harbor.**—At the northeast corner of the town a commercial harbor has been formed by the broadening of the shore quays and the construction of a mole (the Shirikoi) extending about 1,260 feet southeastward from the shore, completed in 1912, with a depth of 20 feet (6.1 m.) alongside for a distance of 200 yards from its extremity. A mole 420 feet in length, situated northward of the extremity of the mole, has been constructed to form a basin for a floating dock, but dredging operations have not yet been undertaken. The ends of the mole and quays are lighted.

**Winds and weather.**—See Meteorological table, Appendix III.

**Storm signals** are hoisted on a special staff on Mitridat Hill.

**Ice breaker.**—The Association of Pilots has an ice breaker, which may be hired. (See Regulations, page 63.)

**Pilotage** is not compulsory.

**KERTCH** (*45° 21′ N., 36° 28′ E.*) is situated on the western shore of the bay, as before remarked, and has a population, including the suburbs, of 50,000.

The town has a fairly fine aspect, and the upper part is the more healthy; it is lighted by electricity; the streets are paved and planted with trees; there is a commercial and a navigational school, and various training establishments.

Before the deepening of the Kertch-Yenikale Channel Kertch enjoyed a large transshipment business, which, however, practically ceased with the improvement of the channel.

**Piers.**—There are nine fairly good piers at Kertch, of which the three largest are from 336 to 490 feet in length, a width of from 47 to 87 feet, and a depth of 11 to 12 feet (3.4 to 3.7 m.); these three belong to the two Russian companies. At the Shirikoi or broad mole there is a depth of from 18 to 19 feet (5.5 to 5.8 m.).

A floating crane capable of lifting 40 tons is available.

**Coal and supplies.**—About 17,000 tons of coal are usually kept in stock. There are a number of lighters, and about 500 tons could be put on board in a day; but all strong winds, setting up a sea, interfere with coaling. Vessels prefer to coal at Mariupol.

Supplies of sorts may be obtained; fresh provisions are plentiful; the water is not of good quality. Only very small repairs can be executed.

**Trade.**—Kertch has no great commercial importance. The most important source of revenue is fishing. About 24,000 tons of grain, chiefly wheat and barley, are exported annually. Salt is also exported.

**Communication.**—Kertch is connected by railroad with the general system of Russia. During the navigational season there is regular communication with Odessa, the Caucasus shore of the Black Sea, the ports in the Sea of Azov, and daily with Taman.

The town is connected by telegraph with the general system.

**Weather bulletins** showing the state of the weather in the various ports in the Black Sea and Sea of Azov are posted up daily at the customhouse and on the wall of the customs watch house.

**Hospital.**—In the event of sickness seamen are admitted to one of the town hospitals.

**Quarantine.**—Vessels bound to the Sea of Azov undergo, when necessary, quarantine at Kertch.

Vessels arriving at Kertch will be boarded by the health officer, and officers in command are not to communicate with the quarantine office to obtain pratique. Vessels requiring disinfection must proceed to Theodosia or Odessa for the purpose.

Vessels outward bound must await the visit of the customs officer, under penalty of a fine. Pratique is granted opposite the fortress and not at the Yenikale end of the channel.

The hatches of vessels bound to ports in the Sea of Azov are sealed at Kertch.

**A broad sand flat** with 4 to 12 feet (1.2 to 3.7 m.), which begins 1 mile to the westward of the town and terminates at the point, extends ¾ mile to the southward as far as the dredged channel.

**Buoy.**—A spar buoy painted red and white and surmounted by a red flag over a white flag is moored on the southeastern side of this flat at about ⅓ mile southward of Yenikale Point.

**Krugoi Bank,** situated about 1 mile southeastward of Yenikale Point, is 1¼ miles in length and about ¾ mile in breadth, with depths of 8 to 12 feet over it. Its northern edge has been dredged to a depth of 24 feet (7.3 m.), forming a part of the Kertch-Yenikale Channel to the Sea of Azov.

**Buoys.**—A black buoy exhibiting a flashing white light and a black and white buoy surmounted by a checkered ball are moored close together on the northern end of Krugoi Bank and on the southern side of the dredged channel.

The old Yenikale Channel lies between this buoy and the black buoys marking the south side of the dredged channel.

**Yenikale Road—Anchorage.**—A vessel seeking an anchorage off Yenikale may approach the fortress and the sandy shore to the northward of it, to within about ½ mile, where there is a depth of about 13 feet (4 m.).

**Lifeboat.**—A short distance southwest of the town there is a lifeboat and rocket station, consisting of several buildings of white stone.

**Depth signals,** to indicate the depth of water in the Kertch-Yenikale dredged channel, are made by the International Code from a signal mast at the pilot station in the town and are repeated from the guard ship.

**Pilots.**—The headquarters of the Kertch Strait pilots is at Yenikale.

There is a pilot station in the town, also on board the guard ship.

**Yenikale** (*45° 21′ N., 36° 36′ E.*).—The town of Yenikale stands on a point at the narrowest part of Kertch Strait, about 5 miles to the eastward of Ak Burnu. A fortress is erected on the curve of a steep shore, which gives the point a peculiar appearance.

**Cape Yenikale (Yuliya),** which lies about 3¾ miles northeastward of Yenikale, is steep and rocky. Mount Khronya, 590 feet (179.8 m.) high, which rises 2 miles to the westward of Cape Yenikale, has a long crest, at the eastern end of which is a conspicuous small summit. (See view on chart.)

**Cape Yenikale Light,** flashing white with red sector, 409 feet (124.7 m.) above the sea, visible 27 miles, is shown from a circular white stone tower 88 feet (26.8 m.) in height, situated on a hill rising from the cape. (See sketch on chart.)

**Shoal.**—A shoal about 30 yards in extent, with a depth of 18 feet (5.5 m.) and 24 to 25 feet (7.3 to 7.6 m.) around, lies southwestward of the light buoys at the entrance to the dredged channel, bearing 146° from Cape Yenikale Lighthouse, distant 1 mile.

**Buoy.**—The position of the shoal is marked by a black and white spar buoy surmounted by a black ball.

**Prohibited anchorage—Telegraph cables.**—Four submarine telegraph cables cross the strait from a point 800 yards northward of Cape Yenikale Lighthouse to Kosenko farm on the opposite shore. Vessels are prohibited from anchoring between a line joining Capes Varzovka and Akhilleon on the north and Mount Kronya in range with Yenikale Lighthouse, bearing 277°, on the south.

**Wreck.**—The wreck of the Russian naval vessel *Rostislav*, with bridge, masts, and funnel visible above water, lies about 2 miles 350° from Cape Yenikale Lighthouse.

**Cape Khroni,** situated 4½ miles north-northwest from Cape Yenikale Lighthouse, is high, rounded, and sloping, and forms the western entrance point of Kertch Strait from the Sea of Azov. (See p. 358.)

**Spoil ground.**—There is a spoil ground off the point, marked on its northern or seaward side by two red spar buoys, each surmounted by two cones, points together.

**EASTERN SHORE.—Zhelyezni Rog,** also known as Cape Kishla, the southeastern point of Kertch Strait, is reddish in color, with a flat summit and steep cliff, and lies 12 miles eastward of Cape Takil, on the western side of the strait, with fairway depths of 9 to 10 fathoms (16.5 to 18.3 m.) in the western portion.

**Outlying dangers—Kishla Reef.**—About 2½ miles 140° from Cape Kishla is Chernisheva, an 18-foot (5.5 m.) isolated patch which is the southeastern extremity of a long and narrow reef named Kishla, which thence curves for 2½ miles northwestward toward Cape Kishla, from which its northern extremity bears 213°, ¾ mile. This reef, as well as those westward of it, is the more dangerous as the cape is not easily recognized, having nothing on it to distinguish it from the rest of the coast, which has the same bold appearance. It has patches with depths of 5 to 18 feet (1.5 to 5.5 m.), with 5 fathoms (9.1 m.) at its edges, and there is a depth of 4 fathoms (7.3 m.) between the reef and the rocks which front Cape Kishla, which rocks extend 3 miles to the eastward of it and ½ mile from the shore, but within the 5-fathom (9.1 m.) curve.

About 3 miles westward of the center of Kishla Reef several rocks exist.

**Southeast Aksenova (Highflyer Rock),** over which the depth is 14 feet (4.3 m.), lies 3 miles 232° from Cape Kishla. A patch of 28 feet (8.5 m.), named Northwest Aksenova, lies 312° 2 miles from Southeast Aksenova.

**Buoy.**—A black spar buoy with conical top mark marks the western side of Southeast Aksenova.

**Volskago,** a patch of 18 feet (5.5 m.), lies nearly 1¼ miles east of Southeast Aksenova; another, with 24 feet (7.3 m.) named Savenko (Viper) Rock, lies 1.2 miles southeastward; and a third, Andreeva, of 28 feet (8.5 m.), 2⅓ miles east-southeast from the same rock. But it is probable that all the ground between Southeast Aksenova and Cape Kishla is foul; the depths westward of them all are from 8 to 9 fathoms (14.6 to 16.5 m.).

**Directions.**—Vessels should pass outside these dangers by keeping Cape Tuzla well open to the westward of Cape Panagiya, bearing 343°, or at night by approaching in the sector of white light shown from Kamuish Burnu Lighthouse.

**Cape Panagiya** lies 4½ miles west-northwest from Cape Kishla, and nearly midway between them a spit of about 3 fathoms (5.5 m.) extends ⅓ mile from the shore; but the whole space appears to be foul ground and should be avoided.

**Panagiya (Trutaeva) Rocks,** a ridge of rocks, some above water and others sunken, extend nearly 1½ miles westward of the cape.

**Fulton Rock,** the outermost of these rocks, with a depth of 3 feet (0.9 m.) on its northern end, lies 1.4 miles 275° from the cape.

**Whistle buoy.**—A black whistle buoy is moored 1,600 yards westward of Fulton Rock in a depth of about 7½ fathoms (13.7 m.); a black spar buoy with cone top mark lies in about 5 fathoms close westward of the rock.

**Directions.**—Cape Yenikale Lighthouse open to Cape Tuzla, bearing 8°, leads westward of Fulton Rock.

**Cape Tuzla** (*45° 11′ N., 36° 36′ E.*), 3½ miles northward from Cape Panagiya. On a hill above the cape is the coast guard station.

**Reefs.**—A reef of sunken rocks extends ¾ mile off Cape Tuzla, and a similar reef extends about 1 mile offshore at 1¼ miles southward of the cape.

Some of the rocks on the spit are awash, others have from 5 to 8 feet (1.5 to 2.4 m.) over them.

Between Panagiya Rocks and Cape Tuzla the coast should be given a berth of 1½ miles to avoid the dangers here mentioned.

**Tuzla Kosa (Spit) and Bank—Beacon.**—A narrow sand spit 7 miles long stretches out to the northwestward from a position 1 mile northeastward of Cape Tuzla in the direction of Cape Palvosksi and nearly bars Kertch Strait, leaving a passage of only ½ mile in width between the bank which prolongs it and the cape. There are some fishermen's huts on the spit, also a coastguard station, and 6 miles northwestward of Cape Tuzla there is a beacon. At the outer end of the spit is a sunken stone barrier.

Tuzla Bank, which borders the spit, has the 2-fathom (3.7 m.) curve about ¾ mile from the western side of the spit and 3-fathom (5.5 m.) curve at from 1¼ to 2¾ miles distant.

**Life-saving station.**—A winter life-saving station, with a lifeboat on runners, is situated on the spit.

**Light and whistle buoy.**—The northwestern extremity of Tuzla Bank is marked, in a depth of 36 feet (11 m.), by a black conical whistle buoy with superstructure carrying the lantern showing a flashing white light. A black spar buoy with cone as top mark is moored close to the light buoy.

**Buoys.**—The western side of Tuzla Bank is marked by five black spar buoys surmounted by cones. The southwest extremity is marked by two similar buoys close together in about 19 feet (5.8 m.) at about 1,200 yards southward of the 3-fathom (5.5 m.) curve.

The Tuzla Bank buoys are not withdrawn during winter.

**Target buoy.**—A black target buoy surmounted by a flag has been moored at a distance of 1,700 yards westward from Tuzla Spit Beacon. It is removed in winter.

**Spoil ground.**—A spoil ground is situated about 3 miles eastward of Kamuish Burnu, on part of which there is a depth of only 13 feet (4 m.); a black spar buoy is moored about 1,200 yards northwestward of this 13-foot (4 m.) patch.

**Directions.**—Mount Temir Oba, 511 feet (155.8 m.) high, northward of Kertch, in range with Ak Burnu, bearing 23°, leads westward of Tuzla Bank. See also page 311 and view on chart.

At night Pavlovski Range Lights in range lead westward of the bank, and Kamish Range Lights (for the Burunski section of the dredged channel) in range astern lead northwestward of the bank.

**Anchorages.**—Anchorage will be found to the southward of Tuzla Bank when northeast winds or the strength of the current prevent sailing vessels from turning to windward. Large vessels anchor westward of Cape Tuzla in from 30 to 40 feet (9.1 to 12.2 m.) water.

**Tuzla Road.**—Vessels also anchor in Tuzla or South Road northeastward of the light and whistle buoy and to the southward of the range line for the Kertch-Yenikale dredged channel.

This roadstead, in which it is reported that shoals frequently form, is only available for vessels of 3½ feet less draft than the depth indicated on the signal mast at Yenikale and at the guard ship.

It is known also as the transshipment roadstead.

**Buoys.**—Two patches of 18 feet (5.5 m.) are situated in this anchorage; the eastern is marked by a black spar buoy surmounted by a cone.

The northwestern limit of Tuzla Road is marked by two white buoys situated at the eastern and western extremities, respectively.

**Prohibited anchorages.**—Anchorage is prohibited in the rectangular areas shown on the chart in the narrow portion of the entrance to the strait southward of Cape Pavlovski and Ak Burnu.

Anchorage is forbidden in the southern area between May 4 and October 28 annually on account of gun practice, and in the northern area throughout the year; the latter area is used as a mining ground.

**Caution.**—Vessels entering or leaving Tuzla Road anchorage must not pass southward of the light and whistle buoy marking Tuzla Spit, as it is moored close northwestward of the sunken stone barrier.

**Tamanski Lake** is situated on the eastern side of Kertch Strait abreast Kertch Bay. Its entrance lies between Tuzla Spit and Chushka Spit, but is much obstructed by the shallow flats extending from them, which narrow the channel to about ½ mile, in which there is a depth of about 13 feet (4 m.). It affords secure anchorage in depths of 14 to 16 feet (4.3 to 4.9 m.), over a sand and mud bottom.

The lake is about 20 miles in length in an east and west direction and is from 3½ to 5 miles in breadth. It is divided into two portions by the spits extending from Markitanskaya and Rubanova Points, leaving only a channel about 200 yards wide between them, with a depth of about 12 feet (3.7 m.); there are depths of 14 to 15 feet (4.3 to 4.6 m.) in the eastern part of the lake, but this portion is not much used as anchorage.

**Aspect.**—Lisaya Hill, on the southern shore westward of Taman town, is 252 feet (76.8 m.) high. Below the hill a rocky, blunt headland, which is conspicuous by its white patches of sand or landslips, extends into the lake.

Eastward of Taman, at nearly 2 miles within the shore line, is a range of hills of from 300 to about 550 feet (91.4 to about 167.6 m.) in height.

On the northern shore of the eastern portion of the lake is a ridge of hills ranging from about 250 to 350 feet (76.2 to 106.7 m.) in height. Mount Goryelaya, the westernmost summit of this ridge, is visible from all parts of the strait and is conspicuous owing to its conical shape.

**Buoys.**—The entrance from Kertch Strait is marked by two buoys about 600 yards apart in a northeast and southwest direction on the 2-fathom (3.7 m.) curve of the spits on either side; the northeastern one is red with an inverted cone top mark, the other is black with a cone top mark. The entrance to the eastern portion of the lake is marked by two buoys on either side similar to those above mentioned.

**A telegraph cable** from Kertch passes through the entrance to Taman, before mentioned.

**Taman Village** (*45° 13′ N., 36° 44′ E.*) is situated on the southern shore at about 5 miles eastward of Cape Tuzla; it is only of importance as a point of communication with the Caucasus.

**Anchorage.**—There is anchorage in a depth of about 15 feet (4.6 m.) at 600 yards distant from Taman Pier. The ruins of the old fort of Fanagoriya are situated about 1 mile eastward of the pier.

**Chushka Spit** is a tongue of sand stretching 9 miles in a southwest direction from the coast guard station, 4½ miles southwestward from Cape Kamenni, which is the northern extremity of the coast of Taman. Its extremity is situated about 4 miles eastward of the beacon on Tuzla Spit, with the entrance to Tamanski Lake between. The western edge of the spit is even and straight, but on its eastern or Tamanski Lake side there are many indentations, which vary in breadth from 100 yards to ½ mile. A flat which carries a depth of from 4 to 12 feet (1.5 to 3.7 m.) surrounds it, and at its southern end projects nearly 3 miles northwestward into Kertch Strait.

**Light buoy.**—A black light buoy exhibiting a flashing red light marks the southwestern extremity of the flat extending from Chushka Spit.

**Chushka Spit Range Lights.**—The front light, fixed red, 52 feet (15.8 m.) above the sea, is shown from a gray framework tower with central column, 59 feet (18 m.) in height, situated near the southwestern end of Chushka Spit.

The rear light, fixed red, 75 feet (22.9 m.) above the sea, is shown from a tower similar to that of the front light, 78 feet (23.8 m.) in height, situated 1,200 yards 195° from the front light. (See sketches on chart.)

These lights in range, bearing 195°, lead through the last section of the dredged channel into the Sea of Azov.

**Cape Kamenni** (*45° 27′ N., 36° 52′ E.*).—From the northern end of Chushka Spit the coast trends in a northeasterly direction for 2 miles to Cape Akhilleon. Three miles eastward of it is Cape Kamenni, which forms the eastern point of entrance of Kertch Strait; it is of moderate height, steep, and of a reddish color. These capes are bordered by rocks, which will be avoided by keeping not less than 1 mile from the shore, where a depth of 5 fathoms (1.5 m.) will be found.

**Directions.**—The white sector of Yenikale Light leads northward of the shore flats extending off Cape Akhilleon.

**Dredged channels.**—A channel has been dredged through the banks in Kertch Strait and in both approaches. It consists of four sections, the first three being the Pavlovski, Burunski, and Kertch-Yenikale Channels, respectively, from south to north; the fourth and last section is the Azov Reach.

**Depths.**—The dredged channel has a depth at ordinary water level of 24 feet (7.3 m.), and according to report was being deepened to 28 feet (8.5 m.). In 1921 the dredged channel was reported to have silted considerably. It has a width at the bottom of 350 feet in various reaches, increased to 630 feet at the junction of the reaches.

In 1925 the Kertch-Yenikale Channel was available for vessels not having more than 23 feet draft.

The depth in these channels is influenced by the direction of the wind. See Water level, also Depth signals, page 307.

In Tuzla Road a channel has been dredged to a depth of 22 feet (6.7 m.), which is marked by two pairs of spar buoys situated on the prolongation of the edges of Kertch-Yenikale Channel, and at distances of 700 yards and 1,600 yards, respectively, from the black buoy marking the southwest entrance to that channel.

**Dredgers—Signals.**—When dredging is in progress in the channel vessels on approaching the dredger must reduce speed, and if necessary stop engines.

The dredger will then be hauled to one side of the channel; by day she will hoist two balls at the yard and by night exhibit two vertical lights, the upper white and the lower red, and will sound one prolonged blast on the whistle; these signals will indicate that the passage is clear.

Should any circumstance prevent the dredger from hauling to the side of the channel in sufficient time she will sound three prolonged blasts on the whistle, indicating that the passage is temporarily closed.

**Pavlovski Channel**, the outer section, commences at a distance of 4 miles southward of Pavlovski Lighthouse. The range lights of Pavlovski kept in range, bearing 357°, lead through the channel, which is about 2¼ miles long.

**Burunski Channel**, the second section, joins the northern end of Pavlovski Channel and is 2 miles in length. The range beacons near Kamish Burnu (see p. 309) kept in range, bearing 217°, lead through the channel, which terminates abreast of Cape Pavlovski, when Kamish and Churubash Lighthouses, come into range, and being kept so astern, bearing 247°, lead through the northern part of Tuzla Road to the entrance of Kertch-Yenikale Channel.

**Kertch-Yenikale Channel** commences abreast Ak Burnu Flat and is 6¼ miles in length. Kamish and Churubash Lighthouses (see p. 310) kept in range astern as before, bearing 247°, lead through the channel until its junction with the last section, at about 1¾ miles southward of Cape Yenikale.

This channel cuts through the shoal tongue extending across the strait from the town of Yenikale, leaving 8 to 9 feet (2.4 to 2.7 m.) on the north and 12 feet (3.7 m.) on the south side of the channel. It also cuts into the northern extremity of the Krugoi Bank, where there is a depth of 8 to 9 feet (2.4 to 2.7 m.), opposite which and on the north side there is a small patch of 12 feet (3.7 m.). With these exceptions the depth on either side are from 12 to 17 feet (3.7 to 5.2 m.).

**Azov section.**—The last or Azov section from its junction with the Kertch-Yenikale section is 1,800 yards in length in a northerly direction to deeper water. Its breadth is 350 feet (106.7 m.), except at its junction with the Kertch-Yenikale Channel, where it is widened to 735 feet.

Chushka Spit Lighthouses (p. 321) in range astern, bearing 194°, lead through this reach into the Sea of Azov.

**Light buoys.**—A black whistle buoy with a flashing white light marks the southern side of the fairway abreast Cape Pavlovski, as already mentioned, and a black buoy with a flashing white light at the northern end of Krugoi Bank off Yenikale Point, in the Kertch-Yenikale section.

The entrance to the dredged channel from the Sea of Azov is marked by a tower-shaped black buoy with flashing white light on the eastern side and by a tower-shaped red buoy with flashing red light on the western side.

**Buoys.**—The buoys marking the various shoals in Kertch Strait approach have already been mentioned.

The dredged channels and the approach through Tuzla Road to the Kertch-Yenikale Reach are marked on the starboard hand, when proceeding from the Black Sea to the Sea of Azov, by black spar buoys surmounted by upright cones, and on the port hand by red spar buoys surmounted by inverted cones. These buoys are placed in pairs.

The eastern end of the Kertch-Yenikale Channel at its junction with the Azov section is marked on the southern side by a black buoy and on the northern side by a red buoy.

Five black and white checkered spar buoys have been placed on the northern edges of Chushka Spit and Krugoi Bank; the whole is known as Kherson Shoal.

On the northwestern shore of Kertch Strait, between the country house of Suvoruski and the Opasnaya coast-guard station, a row of small buoys with red flags as top marks is laid out annually about 1,200 yards from the shore from October 1 until navigation is closed by ice, to mark the fishery limits.

**Caution.**—The buoys are not to be depended on, as they are not always in position at the opening and closing of navigation, and moreover are liable to be carried away by vessels fouling them.

**Pilotage** is compulsory for merchant vessels.

**Directions.**—The following directions are intended as a guide for the masters of vessels:

Vessels proceeding from the Black Sea to the Sea of Azov, having given Cape Takil a berth of about 3 miles, should haul up for Kamish Burnu until Pavlovski range light towers are in range bearing 357°, which being steered for will lead through the first or Pavlovski section of the dredged channel between the black spar buoys on the starboard hand and the red spar buoys on the port hand, until the Kamish Burnu Range Lights are coming on (the tallest and northernmost of a group of chimneys on the northeast shore of Kertch Road forms a useful mark on which to steady when turning into the Burunski Channel), when these kept in range astern, bearing 217°, will lead through the second or Burunski section midway between the buoys on either side; from thence alter course to bring Churubash and Kamish light towers in range astern, bearing 247°, being careful to avoid turning short of the new marks on account of the sunken stone barrier at the outer end of Tuzla Spit, which leads through the northern part of Tuzla Road, northward of the light and whistle buoy and northward of the black buoy on the south side of entrance to the Kertch-Yenikale section; the same range line being preserved will lead to the junction of that section with that of the Azov section, marked by block and red buoys, from where a course of about 15°, with the light structures of the Chushka lights in range astern, bearing 194°, will lead through between the spar buoys on either side and the light buoys at the northern end of it into the Sea of Azov. (See also notes on the chart.)

When in the Kertch-Yenikale section, should Kamish Light tower become difficult to make out, as is the case in cloudy weather, the conical formation of trees northward of it should be kept on with the northern tangent of the clump of trees surrounding Churubash Lighthouse, and these marks carry a vessel in mid-channel from abreast Cape Zmiini northeastward; but when to the eastward of the meridian of Yenikale Light great care is necessary to avoid being set to the southward of the center line.

Vessels proceeding through Kertch Strait from the Sea of Azov, having got onto the Chushka Spit range marks, should reduce speed in plenty of time to get control of the ship, as the turn into the Kertch-Yenikale section is a large one, and the current, if any, will probably be setting across the channel to the southward; when turning the marks Churubash and Kamish Lighthouses should on no account be overshot, the water being slightly better to the northward should a bad turn be made. When turning into the Burunski Channel avoid turning too soon, on account of the sunken barrier mentioned above; the Burunski Channel southern lighthouse is not always easy to distinguish, so it is advisable to be prepared with some other mark, such as Cape Pavlovski Pier, for steering into Burunski Channel.

**At night,** having rounded Cape Takil at a distance of 2 to 3 miles, the vessel will be in the sector of white light shown from the front lighthouse on Kamish Burnu, and may steer up for it or for Tuzla Light Vessel until Pavlovski Range Lights are in range; thence through the various sections as in the daytime, with range lights in range. Cape Yenikale Light comes in sight from abreast the two light buoys at the northern end of the Azov section.

**Regulations.**—See Appendix V.

**Quarantine.**—See Quarantine regulations, page 315.

**Old Yenikale Channel** lies between the black buoys marking the south side of the dredged channel and the black and white buoys with flags marking the north side of Chushka and Krugoi Banks. It has a depth of 12 feet (3.7 m.), and vessels of 11½ feet draft may use it.

## SEA OF AZOV

**General description.**—See page 24.

**TEMRYUKSKI BAY.—Cape Pekli** lies about 3½ miles east-southeastward from Cape Kamenni, and thence the coast continues east-southeastward for 20 miles to the entrance of the Temryuk Lakes, situated at the head of Temryukski Bay. The coast east of Cape Pekli is lower than to the westward and intersected by small ravines. About 10½ miles southeastward of Cape Pekli a large opening, choked with sand, will be seen, named Akhtanizovka, the eastern side of which is formed by a narrow portion of land 9 miles in length, of little height, terminating eastward in another collection of sand, at the extremity of which lies the entrance to the Temryuk Lakes.

On the neck of land between the Akhanizovka entrance and the entrances to the Temryuk Lakes is a small eminence which appears like an island.

**Caution.**—The vicinity of the small eminence eastward of Akhtanizovka is a center of volcanic disturbance, and new islets are sometimes formed. In October, 1880, a small island was upheaved 300 yards from the shore, its appearance being accompanied by steam and smoke.

The island, which was elevated 10 feet (3 m.) above the sea, disappeared in the course of the following winter, and in the spring had become a shoal with a depth of about 1 foot (0.3 m.) over it.

This was the third upheaval of an island within the memory of living inhabitants.

**Kasbek (Temryukaya) Shoal—Buoy.**—A shoal, with 9 feet (2.7 m.) least water, composed of hard sand, extending 1 mile in a north and south direction, 200 yards wide, lies in the fairway of Temryukski Bay about 11 miles to the eastward of Cape Pekli and 2¼ miles from the nearest shore. It is marked by a black spar buoy with conical top mark placed in 22 feet (6.1 m.) water about ½ mile to the northward of it.

**Directions.**—Temryuk Light, westward of Temryuk Harbor, showing as a faint light and bearing 123°, leads between Kasbek Shoal and the shore.

**Temryuk Light** (*45° 20′ N., 37° 15′ E.*), group flashing white, 213 feet (64.9 m.) above the sea, visible 20 miles, is shown from a gray openwork iron tower with central tube, 23 feet (7 m.) in height, situated on a small eminence on the neck of land between Akhtanizovka entrance and the entrance to the Temryuk Lakes.

**Range lights.**—The front light, fixed green, 25 feet (7.6 m.) above the sea, is shown from a lantern on a framework 20 feet (6.1 m.) in height, situated on the dam at the head of the port.

The rear light, fixed red, 55 feet (16.8 m.) above the sea, is shown from a box on a framework 50 feet (15.2 m.) in height, situated 920 yards 140° from the front light.

These lights in range, 149°, lead through the entrance channel. (Extinguished, 1924.)

**Harbor lights.**—Two vertical fixed red lights are shown from the outer end of the eastern mole. When these lights can not be shown two vertical fixed red lights are shown at the inner end of the mole.

Two vertical fixed white lights are shown from the outer end of the western mole. When these lights can not be shown two fixed white lights are shown at the inner end of the mole.

**Anchorage.**—In the month of May vessels arrive for cargoes of fish, for which these lakes are celebrated. They anchor in the bay in 16 or 17 feet (4.9 or 5.2 m.) water, over mud and sand, with Temryuk Church (which is conspicuous, and visible at a good distance from the shore) bearing about 191°.

The anchorage is open from west through north to northeast, but shipwrecks are rare. The strong current setting out of the lakes tends to keep vessels from being thrown on the coast.

**Harbor.**—The harbor entrance (*45° 20′ N., 37° 22′ E.*), situated westward of the entrance to Kurchanski Liman, is protected by two moles which extend from the shore in a northwesterly direction. The eastern mole is about 600 yards in length and is 5 feet (1.5 m.) above the water; the western mole, 420 yards in length, is awash. The construction of the moles is not yet completed.

The channel between the moles is dredged to a depth of 12 feet (3.7 m.). It terminates at its southeastern end, nearly 1½ miles from its entrance, in a small harbor 700 feet square, dredged to the same depth as the channel. A dam or embankment separates the harbor from the river connecting the Temryuk Lakes and serves as a wharf both for the river vessels bringing cargo from the interior and also for the lighters taking this cargo to vessels in the roadstead. The cargo is carried across the dam.

Vessels drawing 7 feet of water are only allowed to use the channel by day, and then are directed by a steamboat.

Near the town the lakes communicate by a narrow channel, through which the waters of the upper or western lake, fed by branches from Kuban River, flow with great rapidity into the lower. The lakes are very shallow and only navigable by flat-bottomed boats. The upper lake is called Akhtanizovski Liman and the lower Kurchanski Liman.

**Temryuk.**—The town of Temryuk, with a population of about 15,000, stands on the western extremity of the neck of land, which divides the upper Temryuk Lake from the lower. It exports grain and fish. There is a telegraph station.

**Coast.**—Eastward of Temryuk the coast, which is low, marshy, and covered with reeds, has numerous fishing stations on it and trends to the northward and eastward for 30 miles to Achuev, situated on both sides of the entrance to the River Karakuban, the northern branch of the Kuban River.

Achuev is also a fishing station, and is bordered by a great extent of marshy country which prevents all communication with the country inland.

The mouth of the river is about 650 feet wide, and has a depth of about 3 feet (0.9 m.). Within the bar the river has depths of from 6 to 12 feet (1.8 to 3.7 m.).

Vessels may anchor abreast the mouth of the river 2 miles from the shore in a depth of 4 fathoms (7.3 m.), and also abreast Sladkoe rivulet, 7 miles to the southwestward.

Depths of 15 to 20 feet (4.6 to 6.1 m.) will also be found along the coast as far as Akhtarski Liman, 25 miles to the northward of Achuev, to the northeastward of which the land becomes a little more elevated.

**Zhelyezinskaya Bank** consists of two patches 5 miles apart in a northwest and southeasterly direction, with depths of 17 to 18 feet (5.2 to 5.5 m.) and about 20 feet (6.1 m.) around them, at about 23 miles southwestward of Kamishevatskaya Kosa. A patch of 12 feet (3.7 m.), reported in 1909, is charted about 7 miles southward of the 17-foot (5.2 m.) patch. A patch of 19 feet (5.8 m.) is reported about 10 miles northwestward of Zhelyezinskaya Bank, but its position is doubtful. The depths for some miles around Zhelyezinskaya Bank are very uneven.

**AKHTARSKI (YASEN) BAY** (*46° 13′ N., 38° 00′ E.*).—Akhtarski Bay lies between Achuevskaya Kosa and Kamishevatskaya Kosa, 19 miles northward of it. It is shallow, with depths under 3 fathoms (5.5 m.) for about 10 miles from Yasenskaya Kosa at its head, and northward of Akhtar Lighthouse is a narrow spit of less than 3 fathoms (5.5 m.) extending 15 miles from the eastern shore of the bay. The village of Akhtari is situated on the eastern shore of the entrance to Akhtarski Liman.

**Buoys.**—A white spar buoy surmounted by an inverted cone is situated westward of the 3-fathom (5.5 m.) curve at about 12 miles westward from Akhtar Lighthouse. A white buoy surmounted by an inverted cone is situated in a depth of about 24 feet (7.3 m.) at about 4½ miles southward from the above.

These buoys mark the eastern limit of the outer anchorage.

The northern edge of Achuevskaya Kosa is marked, in a depth of about 12 feet (3.7 m.), by four black spar buoys surmounted by cones.

A spar buoy, painted white with a red horizontal stripe and surmounted by a cone, is situated near and westward of the edge of the 3-fathom (5.5 m.) curve in Perepravski Road, westward of Yasenskaya Kosa.

A conical buoy, painted white with a red horizontal stripe and surmounted by a cone, is situated in Perepravski Road in a depth of 24 feet (7.3 m.) about 4 miles west-northwestward of the other.

**Akhtari Light,** alternating white and red, with fixed red sector, 56 feet (17.1 m.) above the sea, visible 8 miles, is shown from an iron framework painted black, 32 feet (9.8 m.) in height, situated on the east side of the bay about 5 miles northward of the entrance to Akhtarski Liman.

**Range lights.**—The front light, fixed red, 32 feet (9.6 m.) above the sea, is shown from a black wooden tower 25 feet (7.6 m.) in height, situated at the south side of the town.

The rear light, fixed green, 55 feet (16.8 m.) above the sea, is shown from a black wooden tower 53 feet (16.2 m.) in height, situated 1,150 yards 158° from the front light.

These lights in range, 158°, lead through the dredged channel to the basin at Akhtari in a depth of 10 feet (3 m.).

**Anchorages.**—Vessels usually anchor about 9 miles from the coast, the cargo being brought off in steam barges.

Perepravski Road is the name of the anchorage in the center of the entrance to Aktarski Bay, and has depths of from 22 to 26 feet (6.7 to 7.9 m.).

**Dredged channel to Akhtari.**—A channel 10 feet (3 m.) deep, about 3 miles long and 175 feet broad at the bottom, leads to the basin which has been dredged off Akhtari.

**Channel—Buoys.**—The entrance to this channel is marked by a black buoy and a red buoy, on the western and eastern side, respectively, each with a spar buoy close to it, and the channel itself by nine pairs of spar buoys, those on the western side painted black and surmounted by upright cones, and those on the eastern side painted red and surmounted by inverted cones; these are not charted.

**Basin.**—The basin, which is situated off the end of the pier, is dredged to a depth of 10½ feet (3.2 m.), and, like the dredged channel, is liable to silt a foot or so in the course of the year. The pier is 1,190 feet in length and has an arm extending 350 feet to the southward from a position 350 feet within its outer end. The southern side of the dredged basin is marked by two black spar buoys with cone top marks, and the eastern side of the entrance by a red spar buoy with inverted cone.

**Akhtari** village extends along the shore northward of the pier. It is well laid out, with straight and broad streets. There are two churches and a hospital in the village. Bread, meat, and vegetables are always obtainable. There is railway communication with Krasnodar (Ekaterinodar), also with Yeisk, by branch line to Kirpilskaya. There is a telegraph station in the village.

**Beisugski Liman.**—Eastward of the bay is Beisugski Liman, a lake about 18 miles in length, the entrance to which is nearly closed by a projecting spit of sand about 7 miles long extending from the southern shore. A ferry crosses the entrance. A fishery station is established on this spit about 4 miles from its northern extremity. The Beisug River flows into the lake.

**Beacons.**—Two white masts, each with a red hut at the base, stand on the north end of Yasenskaya Kosa. The lower carrier a triangular top mark and the higher a rectangular top mark. In range they lead into the lake. (Beacons destroyed, 1924.)

**Kamishevatskaya Kosa** is the northern extremity of Akhtarski Bay. Mills are situated near the point, eastward of which is a church and village.

**Caution.**—The shoal water off Kamishevatskaya Kosa is reported (1922) to be extending. Vessels drawing more than 8 feet of water should give the point a berth of at least 3 miles.

**Coast—Obriv Point.**—From Kamishevatskaya Kosa the coast becomes slightly elevated and trends north-northwestward for 17 miles to Obriv Point, a broad, low headland on and at the foot of which is Dolzhanskaya village, from whence Dolgaya Kosa, a sandy projection 9 miles in length, extends in a northwesterly direction. Dolzhansk Church is conspicuous.

**Elenina Shoal,** with depths of from 6 to 17 feet (1.8 to 5.2 m.) and triangular in shape, extends for 15 miles westward from Obriv Point.

**Light buoy and buoys.**—A black conical light buoy with bell, exhibiting a fixed white light, is moored about 14 miles westward of the 18-foot (5.5 m.) curve of the spit, and at about the same distance east-southeastward from Berdyansk Point Lighthouse.

A black spar buoy with conical top mark is moored close to this light buoy.

A black spar buoy with one white band and conical top mark is moored near the edge of the 18-foot (5.5 m.) curve of the spit, at a distance of 18 miles westward from Dolzhansk Church.

**Dolgaya Kosa,** as mentioned above, trends in a northwesterly direction for 9 miles from Obriv Point; thence it is prolonged for another 6 miles in the same direction by a submerged spit, with depths of from 2 to 9 feet (0.6 to 2.7 m.), the former depth being found only a short distance within its outer extremity.

Fishing huts are erected on Dolgaya Kosa as well as on all the sandy points of this sea. They are built on posts, in order to preserve them from being carried away by inundations, and have, when seen from a distance, an appearance as if floating on the water.

**Light and bell buoy.**—A black conical bell buoy showing a flashing white light is moored in a depth of 24 feet (7.3 m.) 2¼ miles northwest of the extremity of Dolgaya Kosa.

A black spar buoy with conical top mark is moored close to the light and bell buoy.

A black spar buoy with conical top mark, 6½ miles northeastward from the light and bell buoy, marks the fairway through the gulf.

**TAGANROG GULF** extends 70 miles to the eastward from Dolgaya Kosa, and varies in width from 28 miles near its entrance to 12 miles near its head. In this gulf are situated the principal ports in the Sea of Azov, viz, Taganrog, Mariupol, and Yiesk. To these may be added Rostov, situated on the right bank of the River Don, which flows into the head of the gulf 25 miles below that town.

The shores of the gulf are flat, uniform in appearance, fronted by landslips of clay, and rarely broken by ravines. Villages and farmhouses are numerous and are useful for ascertaining a vessel's position.

The gulf is divided into three basins, formed by the different banks which border its shores. The first is that of Mariupol, bounded by Dolgaya and Byelosaraiskaya Spits to the westward and by Peschanie and Krivaya Spits to the eastward. The second is the Sazalnik Basin, which is formed between the latter spits and Chimburskaya and Petrushina Spits to the eastward. The eastern basin is that of Taganrog, which lies at the head of the gulf.

**Caution.**—Great caution should be exercised when approaching the several low spits in Taganrog Gulf, especially at night, as they are scarcely discernible, and several vessels have stranded on Byelosaraiskaya Kosa when leaving the gulf for want of proper precautions.

**Wrecks.**—Owing to the shallowness of the gulf and its approach the wrecks that occur from serious obstructions to navigation. Vessels bound for ports in the gulf should therefore proceed with great care.

**Directions.**—See page 347.

**Northern shore.**—See pages 334–344.

**Southern shore.**—**YEISKI LIMAN** (*46° 41′ N., 38° 22′ E.*)—From Dolgaya Kosa the southern shore of Taganrog Gulf turns to the eastward for 25 miles to Yeiski or Eiski Liman, which is of an oblong form about 13 miles in length from east to west. The entrance, nearly 2 miles wide, is formed between Naidenaya Kosa and Yeiskaya Kosa, the latter being a low, narrow strip of sand extending 4½ miles in a northeasterly direction from Yeisk and protecting the inlet from northerly winds. Naidenaya Kosa, a tongue of sand, runs off in a southerly direction for 3 miles from Glafirovka, and then bends the same distance to the eastward, partly under water. This liman would form an excellent anchorage, but its depth is only about 6 feet (1.8 m.), with 13 to 9 feet (4 to 2.7 m.) in the entrance.

The village of Yeiskoe is situated near the head of the inlet, northward of the entrance to the Yeya River. The villages of Nikolaevka and Glaflrovka are situated on the northern shore of the lake.

**Yeisk Channel.**—A swatchway through Sazalnik Flat, eastward of Peschanie Islets, with a depth of 8 feet (2.4 m.), has been buoyed and lighted and is used by coasting craft trading between Yeisk and Taganrog.

**Yeiskaya Kosa Range Lights.**—The front light, flashing red, 51 feet (15.5 m.) above the sea, visible 12 miles, is shown from a black iron tower with triangle top mark, point down, 48 feet (14.6 m.) in height, situated on the northeast extremity of Yeiskaya Kosa.

The rear light, occulting white, 75 feet (22.9 m.) above the sea, visible 14 miles, is shown from a black iron tower with triangle top mark, point up, 69 feet (21 m.) in height, situated 817 yards 185° from the front light. (See Light List.)

These lights in range lead through the buoyed channel eastward of Peschanie Islets.

**Yeisk Harbor Range Lights.**—The front light, fixed red, 45 feet (13.7 m.) above the sea, visible 7 miles, is shown from a mast at the north side of the basin.

The rear light, fixed red, 64 feet (19.5 m.) above the sea, visible 7 miles, is shown from a mast 57 feet (17.4 m.) in height, 408 yards 128° from the front light.

In range they lead through the entrance to the harbor.

**Lights.**—An occulting red light, 26 feet (7.9 m.) above the sea, is shown from a black iron framework 17 feet (5.2 m.) in height, situated on the outer end of the north pier.

A flashing green light, 26 feet (7.9 m.) above the sea, is shown from a black iron framework 17 feet (5.2 m.) in height, situated on the outer end of the south pier.

A fixed red light is shown on the northern side and a fixed green light on the southern side of the entrance to the inner basin.

**Light buoys and buoys.**—Two light buoys have been established to mark Yeisk Channel:

A red light and bell buoy with conical superstructure, exhibiting a group flashing red light, is moored at a distance of 5¾ miles northwestward from Shabelskoe Church.

Vessels should pass westward of this buoy.

A black buoy with cage superstructure, exhibiting an occulting white light, is moored at a distance of 5½ miles westward from the same church.

Vessels should pass eastward of this buoy.

The channel is further marked by black buoys with conical top marks on the western side and by red buoys with inverted cones on the eastern side.

**A fog signal** is made by a bell at the life-saving station south of the inner basin.

**Harbor.**—On the western side of Yeiskaya Kosa an artificial port, dredged to a depth of 12 feet (3.7 m.), has been constructed. It is formed by two moles 600 yards apart, extending from the shore in a northwesterly direction for a distance of 900 yards and having an entrance 90 feet wide. A channel 1,400 yards long, 90 feet wide, and having a depth of 13 feet (4 m.) leads up to the harbor entrance and is continued through the harbor to an inner basin, which is 350 yards long and has a depth of 12 feet (3.7 m.). The depths in the harbor outside the dredged channel are from 4 to 7 feet (1.2 to 2.1 m.).

There are wooden quays in the harbor along the shore northward and southward of the entrance to the inner basin.

This port is only used by coasting vessels, as during strong east winds the depths available are less than 8 feet (2.4 m.); large vessels anchor in the outer roads.

**Lifeboats.**—There is a life-saving station with two lifeboats, one on runners, in the port southward of the inner basin.

Another station, with two lifeboats on runners, is situated at Glafirovka.

**YEISK.**—The town had in 1914 a population of 53,992, and possesses a cathedral, four churches, and a hospital.

**Piers.**—On the eastern side of Yeiskaya Kosa and northward of the town are two wooden piers with depths of 5 and 6 feet (1.5 and 1.8 m.) at their outer ends, now little used since the construction of the port.

**Supplies.**—Fresh meat and other provisions are obtainable.

**Trade.**—Cattle breeding is extensively carried on in the district. Principal exports are wheat and barley.

**Communication.**—Daily steamer service with other ports in the gulf during the summer. Communication by railroad with Pavlovskaya and Ekaterinodar. There is a telegraph station.

**Glafirovka** is situated on the eastern side of the entrance to Yeiski Liman. At ½ mile south of the village is a two-storied stone house surrounded by storehouses, abreast which is a pier having a depth of 5 feet (1.5 m.) alongside. Small coasting vessels load wheat here.

**Coast—Sazalnikskaya Kosa.**—From Glafirovka the coast trends northward for 8 miles to Sazalnikskaya Kosa (*46° 53′ N., 38° 31′ E.*), from whence it turns eastward, forming the southern side of Taganrog Gulf.

**Lifeboat.**—A life-saving station, with lifeboat on runners, stands on Sazalnikskaya Kosa.

**Shabelskoe (Sazalnik) village,** situated 2 miles southwestward from the extremity of Sazalnikskaya Kosa, may be distinguished by its church, which has five conical cupolas. Near the church are three conspicuous mills; also some brickworks.

**Sazalnik Flat and Peschanie Islets.**—A ridge with 1 to 4 feet (0.3 to 1.2 m.) over it extends 4½ miles west-northwest from Sazalnikskaya Kosa, and an extensive bank of sand, with general depths of from 8 to 12 feet (2.4 to 3.7 m.) and many shoaler patches, extends 9 miles farther westward and has several islets on it, about 5 miles from the shore, named Peschanie Isles, on which are fishing stations. Its extremity is Cockerill Shoal, which has a depth of 12 feet (3.7 m.). The flat, with depths under 18 feet (5.5 m.), extends northward for about 4 miles from Cockerill Shoal, beyond which is Peschani Light Vessel.

**Buoys.**—Two black spar buoys, each surmounted by a cone, are moored in a depth of about 15 feet (4.6 m.), at a distance of 5 miles northwest from Shabelskoe Church.

A spar buoy painted black with a white band, with conical top mark, is moored in a depth of 17 feet (5.2 m.) on the west side of Cockerill Shoal.

**Peschani Light Vessel** (*47° 00′ N., 38° 14′ E.*) shows two fixed white lights, one on each mast, 36 feet (11 m.) above the sea, visible 9 miles. It has a straw-colored hull, black ball at each masthead, and Песчаный in black letters on sides. When at her station a yellow flag with blue cross is hoisted at the mainmast head under the ball. (See Light List.)

**A fog signal** is made on a steam whistle.

**Buoy.**—At a distance of 500 yards eastward of the light vessel there is a black spar buoy with cone. Vessels must pass north of the light vessel and this buoy.

**Chimburskaya Kosa.**—From Sazalnikskaya Kosa the coast curves eastward for 17½ miles to Chimburskaya Kosa, which lies northeast of two hillocks and the village of Margaritovka.

**Lifeboat.**—A life-saving station, with lifeboat on runners, is situated at Margaritovka. There is a telegraph station in the village.

**Grecheskaya Bank,** a triangular-shaped shoal, projects about 6½ miles in a northwesterly direction from Chimburskaya Kosa, with depths of from 4 to 12 feet (1.2 to 3.7 m.). This bank is extending to the northward.

**Light buoy—Buoy.**—The northern extremity of Grecheskaya Bank is marked by a black light buoy with conical superstructure showing an occulting white light just southward of the dotted fairway track, and by a black spar buoy, both in 18 feet (5.5 m.) water.

These buoys mark the southern side of the channel followed by vessels bound for Taganrog and Rostov. This light buoy is replaced by a black spar buoy when withdrawn for repair or for any other cause. It can not be relied on.

**Byeglitski Light Vessel,** described on page 339, is situated on the northern side of the channel between Grecheskaya Bank light buoy and Peschani Light Vessel.

**Ochakovskaya Kosa** (*47° 02' N., 39° 06' E.*).—Between Chimburskaya Kosa and Ochakovskaya Kosa, 9½ miles northeastward, the depth is only about 10 feet (3 m.) at 2 miles from the shore, and 8 miles to the eastward of this latter spit is the Svinoe mouth of the southern branch of the River Don, near the village of Kagalnik.

Two miles westward of Ochakovskaya Kosa is the important village of Semi Bakol, which has a conspicuous church.

The bank which prolongs this spit joins that which extends from the mouths of the Don and fills up the eastern part of the gulf.

**Light buoy.**—A red buoy with cage superstructure, from which is exhibited a flashing red light, is moored in a depth of 16 feet (4.9 m.) southeastward of Petrushina Kosa, which extends from the northern shore of the gulf, and 5½ miles eastward of Grecheskaya light buoy; a red spar buoy with inverted cone, is moored close-to.

These buoys mark the northern and western sides of the channel leading to Taganrog.

The light buoy is replaced by a red spar buoy when withdrawn for repair or for any other cause. It must not be relied on.

**River Don.**—See page 344.

**The northern shore** of Taganrog Gulf will be now described.

**Byelosaraiskaya Kosa** (*46° 52' N., 37° 18' E.*).—The northern entrance point of Taganrog Gulf is formed by Byelosaraiskaya Kosa, a low, sandy point extending in a southwesterly direction for 7 miles from the village of the same name. Numerous fishing huts are built on this spit.

The coast westward of Byelosaraiskaya Kosa is described at page 348.

**Beacon.**—Near the extremity of the spit is a mast beacon 60 feet (18.3 m.) in height with two horizontal battens as a top mark.

**Buoys.**—A red spar buoy surmounted by an inverted cone, moored in a depth of 24 feet (7.3 m.) 1½ miles to the southward of the beacon, marks the edge of the bank extending from the extremity of the spit. A similar buoy in a depth of 25 feet (7.6 m.), situated 1¼ miles to the northeastward of the former, marks the southern side of an 18-foot (5.5 m.) shoal.

**Byelosarai Light,** occulting white, 70 feet (21.3 m.) in height, visible 14 miles, is shown from an octagonal white stone tower with gray lantern, 72 feet (21.9 m.) in height, situated on Byelosaraiskaya Kosa.

**A fog signal** is made on a whistle.

**Lifeboat.**—A life-saving station with lifeboats is situated near the lighthouse.

**The coast** from Byelosarai Lighthouse trends northeastward for 16 miles to the town of Mariupol and is almost straight, the latter part from Byelosarai village being steep and uniform in height.

**PORT OF MARIUPOL** (*47° 03′ N., 37° 32′ E.*).—Opposite Zintseva Valley, about 2½ miles southwestward of the town and connected with it by railroad, is a port consisting of an inner and outer harbor, covering an area of over 300 acres and approached by a dredged channel about 6.9 miles in length in a 331° direction to the mouth of the harbor, with a depth of 24 feet (7.3 m.) in 1924 and a breadth of 525 feet at its seaward end and of 350 feet thence to the entrance to the harbor. It is liable to silt, but depth signals are made.

The port is formed by two moles or breakwaters ½ mile apart, which extend from the shore in a southeasterly direction for about 1,600 yards, leaving a passage 395 feet wide.

Within the harbor, 440 yards from the shore and parallel to it, is a detached breakwater 500 yards in length.

**Harbors—Depths.**—It has two harbors, that formed by the mouth of the Kalmius, and the port or harbor of Mariupol at 3 miles to the southwestward, off the Zintseva Valley.

The harbor in the Kalmius River has a depth of about 10 feet (3 m.) in the dredged channel leading to it, depending on the force and direction of the wind.

There are two inner harbors, divided by a short arm, each about 1,000 yards in length and 400 yards in breadth. The northern one is known as the old harbor; the southern one as the coal harbor. The depths in the outer and inner harbors are from 22 to 25 feet (6.7 to 7.6 m.).

Vessels can load to a draft of 23½ feet alongside the main quay in the port.

**Depth signals.**—The depth of water in the channel and the dredged portion of the harbor is signaled from a mast on the southern molehead by balls and cones during the day and by white and red fixed lights during the night.

Each foot above 23 feet (7 m.) is represented by a ball by day or a white light by night hoisted at the yardarm.

Each ¼ foot is represented by a cone by day or a red light by night, hoisted at the yardarm above the balls or white lights, respectively, thus:

One cone or one red light indicates 23¼ feet (7.1 m.).

Two cones or two red lights indicate 23½ feet (7.2 m.).

One ball or one white light indicates 24 feet (7.3 m.).

Two balls or two white lights indicate 25 feet (7.6 m.).

**Range lights—Lights.**—Range lights lead to the River Kalmius. The front light, fixed red, 48 feet (14.6 m.) above the sea, is shown from a white beacon consisting of two columns with crossbeam and disk, 55 feet (16.8 m.) in height.

The rear light, fixed red, 123 feet (37.5 m.) above the sea, is shown from a white beacon consisting of two columns with crossbeam and disk, 69 feet (21 m.) in height, situated 1,360 yards 338° from the front light.

These lights in range, 338°, lead through the center of the dredged channel.

A flashing green light, 22 feet (6.7 m.) above the sea, is shown from a red iron plate situated at the outer extremity of the breakwater at the entrance to River Kalmius.

Range lights lead between the breakwaters to the port. The front light, fixed red, 133 feet (40.5 m.) above the sea, is shown from a wooden truss surmounted by a white circular top mark with white trapezoidal target beneath, 59 feet (18 m.) in height, situated back of the town about 1¼ miles from the port entrance.

The rear light, fixed white, 245 feet (74.7 m.) above the sea, is shown from a black pentagonal hut on iron pillars, 46 feet (14 m.) in height, situated 1,625 yards 331° from the front light.

A reserve front light for the above range, fixed red, 66 feet (20.1 m.) above the sea, visible 8 miles, is shown from a wooden tripod with shield and triangle, base down, 60 feet (18.3 m.) in height, situated on the inner end of the northern mole.

A fixed red light, 32 feet (9.8 m.) above the sea, visible 5 miles, is shown from a red iron tower with keeper's dwelling, situated on the south molehead at the entrance to the port.

A fixed green light, 32 feet (9.8 m.) above the sea, visible 5 miles, is shown from a red iron tower with keeper's dwelling, situated on the north molehead at the entrance to the port.

The two passages between the outer and inner harbors are marked by lantern lights, the southwest passage by two fixed green lights, and the northeast passage by a fixed white light. The entrance to the new harbor is marked by two fixed green lights.

**A light buoy** exhibiting a flashing white light is moored on the western side of the dredged channel at a distance of 3 miles from the harbor entrance.

**Buoys.**—On the western side of the dredged channel, just outside the harbor, is moored a red conical light and bell buoy exhibiting a flashing white light. The entrance is between this buoy and the north mole, and is only 230 feet wide.

The channel within the outer light buoy is also marked.

No signal will be hoisted when the depth is 23 feet (7 m.), but when, owing to occasional strong winds, the depth is less than 22 feet (6.7 m.) a blue pennant is exhibited by day and a blue light hoisted at night.

**Anchorage.**—Vessels anchor about 2 miles to the southward of the river entrance in from 15 to 16 feet (4.6 to 4.9 m.) of water, muddy bottom, and good holding ground; but the roadstead is open from southwest through south to east. Nearer the shore there is a depth of 14 feet (4.3 m.), over a sandy bottom.

**Storm signals** are shown at Mariupol. See page 33.

**Ice.**—The port is usually open from about March 21 to January 13. See also page 62.

An ice breaker is employed to keep the port open. The ice breaker is fitted with wireless, the call signal being LMCH. Signals are received from 6.30 a. m. to 8.30 a. m., from 1.30 p. m. to 3.30 p. m., and from 11.30 p. m. to 1.30 a. m., Petrograd time. See Regulations, page 63.

**Pilots.**—There is a service of pilots at Mariupol. Pilotage is compulsory.

**Caution.**—Vessels entering the port must be careful to avoid the anchors of the dredgers when at work in the channel.

**The River Kalmius,** formerly the only harbor of Mariupol, has a depth of 12 feet (3.7 m.) for a distance of about 2 miles, and there is about 10 feet (3 m.) in the channel leading to it from seaward, depending on the force and direction of the wind.

After prolonged southerly winds the water in the river mouth will sometimes rise as much as 6 feet (1.8 m.) above the normal level. This phenomenon is, however, rare.

There is a large stone quay on the west bank of the river, northward of which is a small camber with a depth of 14 feet (4.3 m.), in which vessels can winter. Coasters and the small steamers plying to the various ports in the Sea of Azov make use of this harbor.

**Breakwater.**—A breakwater 1,400 yards in length has been constructed in continuation of the former training wall, the whole extending about 1,800 yards from the eastern side of the entrance in a 158° direction.

**Lifeboat.**—A life-saving station, with lifeboat on runners, is situated at the river entrance.

**MARIUPOL** (*47° 06′ N., 37° 34′ E.*) is picturesquely situated on the right bank of the Kalmius River, which enters the sea on the eastern side of the town. The massive cathedral of St. Mari Magdalini, which is situated in the upper part of the town, is the first object sighted when coming from a distance. The population in 1916 was about 65,000.

**Repairs.**—Only small repairs to machinery can be effected.

**Coal and supplies.**—A large quantity of coal, bituminous and anthracite, is usually in stock. Coaling can be carried out alongside a quay in the new port, where there is a depth of 14 feet (4.3 m.), from railway trucks by means of hydraulic lifts, or in the roadstead from large lighters, of which there are some 25 in the port. About 800 tons per day could be shipped at the quays and 200 in the roadstead; coaling is impeded in the latter by strong winds. There is a 30-ton crane.

Provisions of all kinds are plentiful. Water is difficult to obtain.

**Communication.**—There is daily communication with Azov and Black Sea ports. Mariupol is connected with the Russian railroad system. There is telegraphic communication with all parts.

**Trade.**—Mariupol is the port for the Donets Basin, which is rich in minerals, with an annually increasing output of coal and iron.

**Coast.**—From Mariupol the coast trends to the eastward as far as Taganrog, nearly 60 miles.

This coast forms part of the territory of the Don Cossacks, whose villages occupy the valleys between the Kalmius and Mius Rivers.

**Krivaya Kosa.**—About 25 miles eastward from Mariupol a flat, sandy point extends from the coast in a southerly direction for 2¾ miles, when it turns to the southwestward, forming Krivaya Kosa.

A bank with from 2 to 6 feet (0.6 to 1.8 m.) water extends for nearly 2 miles southwestward from the extremity of the spit.

At the head of the bight, westward of Krivaya Kosa, is the village of Novo Nikolaevskaya, which may be recognized by its lofty white church. There is a telegraph station in the village.

The village of Krivokosski, situated on the eastern side of the point, has storehouses for wheat and three piers with a depth of 11 feet (3.4 m.) at their outer ends. The steamers between Taganrog and Mariupol call here. Grain is exported.

**Beacon** (*47° 03′ N., 38° 08′ E.*).—A mast beacon with supports, 60 feet (18.3 m.) in height, the top mark consisting of three vertical battens, stands near the extremity of Krivaya Kosa.

**Buoys.**—Two red buoys, one a spar and the other a conical buoy, with inverted cone top marks are moored in about 15 feet (4.6 m.) at about 1 mile southward of the southern edge of the 1-fathom (1.8 m.) curve.

About 8.9 miles to the southwestward of Krivaya Kosa Beacon is moored a red conical light buoy exhibiting a flashing red light.

A red spar buoy with inverted cone top mark lies close to it.

**Lifeboat.**—A life-saving station with lifeboats is situated on the spit.

**Peschani Light Vessel** lies 5 miles southeastward from Krivaya Beacon. See page 333.

**Byeglitskaya Kosa,** situated 20 miles eastward from Krivaya Kosa, extends 2 miles to the southeastward from a point near the village of Varvatsi. Between Krivaya and Byeglitskaya Spits the coast runs back, forming a bay near the head of which is the village of Veselo Voznesenskaya, recognizable from seaward by its church and by a large stone windmill on the hillside. Four miles westward of the extremity of Byeglitskaya Kosa is the wide valley of the Mius River, the entrance to which is narrowed by two sandy spits having a shallow channel between them.

The mills at Varvatsi farm, situated on the rising ground at the base of the spit, are conspicuous.

**Zolotaya Bank,** with a depth of 6 feet (1.8 m.), extends southwestward and southeastward from Byeglitskaya Kosa for a distance of 5 miles, beyond which a depth of about 12 feet (3.7 m.) will be found. To the westward it joins the bank which fronts the shore between Krivaya and Byeglitskaya Spits; to the eastward it is connected with Petrushina Bank.

The depths between the southern extremity of Zolotaya Bank and the Grecheskaya Bank are about 16 feet (4.9 m.) at about midway between the two shores.

**Buoy.**—A red spar buoy with red cone point down is moored on the southern edge of Zolotaya Bank.

**Lifeboats.**—There is a life-saving station, with a lifeboat on runners, Zolotaya Kosa, 3 miles eastward of Byeglitskaya Kosa, and another 4 miles further eastward at Novo Marinka farm, where there are two lifeboats.

**Byeglitski Light Vessel** (*47° 01′ N., 38° 35′ E.*) shows two fixed red lights, one at the fore and one at the main masthead, 59 feet (18 m.) above the sea, visible 13 miles. It has a red hull, three masts, flag at mizzen masthead, and Бѣглицкiй in black letters on white band on sides. (See Light List.)

**A fog signal** is made by a siren.

**Petrushina Kosa** lies 12 miles east-northeastward from Byeglitskaya Kosa, the intervening coast being steep and above 60 feet (18.3 m.) in height.

**Lifeboat.**—There is a life-saving station on Petrushina Kosa provided with a lifeboat and also with a lifeboat on runners.

**Light buoys.**—Southward of Petrushina Bank and marking the channel to Taganrog are two light buoys, before described. See pages 333 and 334.

**Petrushina Flat,** with depths of 6 to 9 feet (1.8 to 2.7 m.), extends nearly 6 miles southward of Petrushina Kosa.

**Taganrog Point.**—Four miles northeastward of Petrushina Kosa is Taganrog Point, which rises to a height of 96 feet (29.3 m.), with a flat summit, and falls steeply toward the sea, the coast between forming a bight.

The town of Taganrog is situated on the summit and the port at the extremity of the point.

**Cherepakha Islet Light,** flashing red, 15 feet (4.6 m.) above the sea, visible 7 miles, is shown from a red iron framework 16 feet

(4.9 m.) in height, situated 1½ miles southward of Taganrog on the low artificial islet of Cherepakha. The light is removed during the winter.

**TAGANROGSKI ROAD** occupies the eastern part of the gulf from nearly as far westward as the meridian of Krivaya Kosa to the mouths of the Don. The western limit of the road is marked by a green conical buoy.

**Guard ship.**—A guard ship has been moored in Taganrogski Road about midway between Peschani and Byeglitski Light Vessels. It is of similar build to the light vessels and has two masts with white hull.

A flag will be hoisted at the ensign staff; at night, in addition to the regulation lights for vessels at anchor, a green light will be exhibited from the fore-topmast stay at an elevation of 50 feet (15.2 m.).

The guard ship will lie in Taganrogski Road during the navigable season in order that vessels in the road may communicate with the harbor authorities and other departments of the port and town.

The guard ship is under the jurisdiction of the Taganrog harbor authorities, and an official of that department will be on board to observe the movement of vessels in the road; also a surgeon to render medical aid on board vessels.

**Radio messages** will be transmitted from the guard ship to the shore quarantine radio station at Taganrog and thence to the town telephone station, which will also receive telegrams for transmission to the guard ship. Call letters ROE.

Telegrams are transmitted from 6 a. m. to 10 p. m. (Petrograd time) on payment.

**Regulations.**—Foreign-going steamers arriving to load grain anchor eastward of the guard ship; when loaded to 18 feet they must moor westward of the guard ship, toward the western limit of the road.

**Caution—Water level.**—Vessels should take precautions against swinging over their anchors, on account of the variation in the level of the water caused by the winds.

On account of these changes of level it is impossible to show on the chart the true depths, those given being the mean level obtained by observation. Southerly and westerly winds increase the depth and northerly and easterly winds diminish it by 2 to 4 feet (0.6 to 0.9 m.).

Occasionally after a strong wind the head of the gulf dries for a distance of 5 miles from the mouths of the Don, and in the neighborhood of Taganrog the bay north of the town becomes nearly dry.

The water level, apart from the changes caused by the wind, is highest in the spring and lowest in the autumn.

**Taganrog Light,** fixed white with red and green sectors, 161 feet (49.1 m.) above the sea, visible 19 miles, is shown from a white cylindrical masonry tower 73 feet (22.3 m.) in height, situated at the southeast point of Taganrog. (See Light List.)

**A fog signal** is made by a bell near the life-saving station.

**Ballast ground.**—Vessels carrying water ballast, after passing through the usual customs formalities at Kertch, have an official placed on board, who proceeds with the ship to Taganrogski Road. On arrival a flag is hoisted, acquainting the customs authorities that the vessel has water ballast, when lighters and coasting vessels are permitted to proceed alongside at once and commence discharging their cargoes. Severe regulations exist respecting throwing rock ballast overboard. It is required to be landed, under penalty of a fine, at the port.

**Anchorages.**—Vessels of the deepest draft that can enter the Sea of Azov anchor about 25 miles from Taganrog, to the southwestward of Byeglitzki Light Vessel, in about 20 feet (6.1 m.). Other vessels anchor nearer the town, according to their draft, in from 14 to 18 feet (4.3 to 5.5 m.) of water.

Communication is carried on by steam barges, tugs and lighters.

The bottom in the road, in depths of more than 12 feet (3.7 m.), consists of sand and mud; in less than 12 feet (3.7 m.) it consists of sand only, and near the shores of sand and shells.

After several days in the anchorage it is sometimes difficult to weigh the anchor, even when anchored where the bottom is hard.

**TAGANROG HARBOR.**—The harbor, which lies at the southeastern end of the town, is formed by two curved moles 600 yards apart, with an opening 133 yards wide between their outer extremities. An inner mole 240 yards in length separates it from Petrovski Basin, and Remontni (Repairing) Basin is situated to the southwestward of the latter. The depth in the harbor varies from 4 to 12 feet (1.2 to 3.7 m.). The depth in the approach channel to Remontni Basin from the southeastward is 8 feet (2.4 m.).

On the northeastern side of the town is a stone quay 3,700 feet in length, but owing to the shallowness of the water only the eastern end of this quay, where there is a depth of 12 feet (3.7 m.), is now in use.

The Taganrog metal works, 2½ miles northward of Taganrog, have a harbor which is 395 yards in length, 190 yards in width, and has masonry quays. Ore is brought from Kertch for the works, and coal is exported to that place.

**Dredged channels.**—A dredged channel 3¾ miles in length, 280 feet in width, and with a least depth (1925) of 10½ feet (3.2 m.) at mean water level, leads up to the harbor. It is marked by a number of pairs of spar buoys with flags, black on its eastern and red on its western side.

A dredged channel about 2¼ miles in length, 140 feet in width, and with a depth of about 9 feet (2.7 m.) at mean water level, leads from off the north mole of the harbor to the metal works harbor northward of the town. It is marked by iron buoys colored in a similar manner to the other channel.

**Depth signals.**—The depth of water in the dredged channel is indicated from a flagstaff on the south mole by the following signals:

By day the signals are made by means of balls, each large ball indicating 1 foot (0.3 m.) and each small ball 3 inches (0.1 m.).

By night the signals are made by means of white and red lights, thus:

One white light indicates a depth of 5 feet (1.5 m.).
One white and one red light, 5¼ feet (1.6 m.).
Two white lights, 6 feet (1.8 m.).
Two white lights and one red light, 6¼ feet (1.9 m.).
Three white lights, 7 feet (2.1 m.).
Three white lights and one red light, 7¼ feet (2.2 m.).
Four white lights, 8 feet (2.4 m.).
Four white lights and one red light, 8¼ feet (2.5 m.).
Five white lights, 9 feet (2.7 m.).
Five white lights and one red light, 9¼ feet (2.8 m.).
Six white lights, 10 feet (3 m.).

Depths above 10 feet (3 m.) are not shown.

The absence of signals at the mast indicates that access to the channel is closed.

A red triangular flag is hoisted when the water is falling and a white triangular flag when the water is rising.

**Range lights.**—The front light shows two vertical fixed white lights, 21 feet (6.4 m.) above the sea, from a black and white post with black ball, situated on the north mole of the basin.

The rear light shows two vertical fixed white lights, 37 feet (11.3 m.) above the sea, from a black and white post with black square, situated 116 yards 355° from the front light.

These lights in range 355° lead through the channel to the harbor entrance.

**Harbor lights.**—Lights are exhibited from the heads of the north and south moles of the new basin, on both sides of the entrance to Petrovski Basin, on both sides of the entrance to Remontni Basin from Petrovski Basin, and from the heads of the two moles of the metal works harbor. (For details see Light List.)

**Beacons.**—A beacon is situated on the north mole between the above range lights; it consists of a black pole surmounted by a black square, and is 22 feet (6.7 m.) in height above the mole.

Two pillars 860 yards apart, from which lights are exhibited, situated on the harbor mole at the metal works and on the shore northward of it, respectively, when in range, bearing 340°, lead through the dredged channel to the works. The front beacon is painted green and the rear one white.

**Winds and weather.**—See Meteorological table, Appendix III.

**Storm signals** are shown from a signal staff near the lighthouse, and repeated by the guard ship anchored in the outer road between the Peschani and Byeglitski Light Vessels.

**Lifeboat.**—There is a life-saving station with two lifeboats on the south mole.

**Ice breaker.**—A small ice breaker is employed, but it is impossible to keep the gulf and harbor open during severe cold weather.

**Pilots.**—Pilotage is compulsory. Pilots can be obtained at Kertch.

**TAGANROG** (*47° 12′ N., 38° 56′ E.*), situated on the northern side of the head of the gulf, is one of the most important ports in Russia. It has large and numerous warehouses and many very handsome private dwellings. The town suffers from occasional violent dust storms and the sanitary condition is not good, there being no system of drainage and no water supply except from wells and cisterns. Malaria is prevalent in the summer. The population in 1914 amounted to 68,000.

The surrounding country is fertile and produces excellent fruits and culinary vegetables. The vine and mulberry flourish, but the country is destitute of wood.

**Coal and supplies.**—About 5,000 tons of native coal of fairly good quality is kept in stock, and the collieries being in the immediate vicinity, any quantity could be obtained by giving a short notice. Small vessels can coal alongside a quay, where there is a depth of about 8 feet (2.4 m.). Vessels of heavier draft must coal in the roadstead, the coal being carried in lighters a distance of from 25 to 30 miles, and with the least swell they could not remain alongside. Vessels, however, rarely coal at Taganrog.

Supplies of all kinds can be obtained, but no repairs to machinery effected except at Rostov-on-Don. There is a slip in the harbor which will take small craft. See Appendix I.

The water alongside will be found potable if the sediment be allowed to settle before it is used. The water on shore is bad.

**Trade.**—The exports from Taganrogski Road, viz, from Rostov, Taganrog, Yeisk, Azov, and other towns in the gulf, consist chiefly of grain of all kinds, flour, wool, oil cake, caviare, and butter. The imports consist of fruit, nuts, oil, etc.

**Communication.**—There is railroad communication with Kharkov, Rostov, and the general Russian system.

Taganrog has regular communication by steamers with other ports in the Sea of Azov and the Black Sea; also telegraphic communication with all parts, and telephonic communication with Rostov.

**Radio.**—There is a radio station, call letters RAV, wave length 600 meters, range 400 miles.

**Quarantine.**—All quarantine formalities are carried out at Kertch.

**Hospital.**—There is a private hospital for seamen, but infectious cases are not admitted.

**Taganrogski Bay.**—From Taganrog the coast trends to the northward for 4 miles and then to the eastward for 3 miles to Kurichi Rozhok Kosa, forming Taganrogski Bay, in which there is only a depth of from 4 to 7 feet (1.2 to 2.1 m.). The Sambek River flows into the northern part of the bay.

From Kurichi Rozhok Kosa the coast runs in an easterly direction for 8 miles, when it turns to the southward and is broken up into numerous low islands, between which the water of the Don River flow into the gulf.

**Don River Entrance Light Vessel** (*47° 07′ N., 38° 59½′ E.*) shows a fixed white and two fixed red lights, 40 feet (12.2 m.) above the sea. It has one mast, a black hull with red band near the water line, and blue bulwarks, "Донской Гирловой Маякъ" on sides. (See Light List.)

The national flag, with the letters К. Д. Г. on the white part, is flown from the staff when the light vessel is in position.

**A fog signal** is made by a bell.

**Depth signals.**—See page 345.

**DON RIVER.**—The Don River empties into the head of the Gulf of Taganrog by several mouths, which extend from the village of Sinyavka on the north to as far as Kagalnik, 12 miles to the southward. The whole delta is covered with reeds 6 feet (1.8 m.) or more in height. It overflows its banks in May, but returns to its usual limits at the end of June or beginning of July.

This river, which flows from Lake Ivan, in the government of Tula, runs southeastward to within 40 miles of the Volga, when it turns abruptly to the southwest for 240 miles and empties into the head of the Gulf of Taganrog, its whole course being about 900 miles.

**Entrances.**—Of the several mouths of the river the two principal are the Egurcha mouth, 5 miles southward of Sinyavka, to which a channel has been dredged, and the Merinovoe, about 5 miles farther south. The former is the channel used by vessels proceeding to Rostov; the latter is only used by timber rafts.

**Depths.**—A depth of not less than 10 feet (3 m.) is maintained in the dredged channel to the Egurcha mouth and 12 feet (3.7 m.) in the river as far as Rostov.

The depth in the dredged channel has decreased greatly (1922) because of insufficient dredging.

**Water level.**—A continuance of strong northeasterly winds will reduce the depths in the delta of the Don by as much as 9 feet (2.7 m.). The river level is highest in the spring and lowest in the autumn. See also page 44.

**Dredged channel—Buoys and lights.**—The dredged channel leading from Taganrog Gulf into the Egurcha mouth, about 12 miles in length with a depth of 10 feet (3 m.), consists of three reaches marked by black spar buoys on the starboard hand (south side) and by red spar buoys on the port hand, surmounted by cones, in accordance with the Russian system.

In addition to the spar buoys the channel is also marked by posts from which lights are exhibited at night. Two vertical lights are shown from a post on each side of the bend between the first or sea reach and the second reach, and on each side of the bend between the second reach and third or river reach. Buoys carrying two vertical lights are also moored at the bends; the lights are white on the starboard hand and red on the port hand.

**Morski Channel Range Lights.**—The front light, flashing white, 34 feet (10.4 m.) above the sea, visible 11 miles, is shown from a black framework tower carrying a diamond shape, 32 feet (9.8 m.) in height, situated on an artificial islet in the shallow water northeastward of the northern end of the first reach of the channel to Rostov.

The rear light, occulting white, 73 feet (22.3 m.) above the sea, visible 12 miles, is shown from a black framework tower carrying a disk.

These lights in range, 58°, lead through the first reach of the dredged channel.

**Pryami Channel Range Lights.**—The front light, fixed white, 22 feet (6.7 m.) above the sea, visible 9 miles, is shown from a black stone tower 22 feet (6.7 m.) in height, situated on the land eastward of the second reach.

The rear light, fixed white, 64 feet (19.5 m.) above the sea, visible 13 miles, is shown from a black stone tower with white vertical stripe, 62 feet (18.9 m.) in height, situated on the land eastward of the second reach.

These lights in range, 93°, lead through the second reach. (Extinguished, 1924.)

**Obschchi Channel Range Lights.**—The front light, fixed white, is shown from a black mast with triangular top mark, 38 feet (11.6 m.) in height, situated on an island northward of Pereboini Island.

The rear light, fixed white, is shown from a black mast with disk topmark, 53 feet (16.2 m.) in height.

These lights in range, 45°, lead through the third reach. (Extinguished, 1924.)

**Depth signals.**—The following signals to indicate the depth of water in the dredged channel are made from the light vessel and from the signal mast at the Pereboini pilot station; also from a barge moored above Rostov railroad bridge:

By day—

Each red ball at the upper yardarm indicates a depth of 5 feet (1.5 m.).

Each large black ball (3 feet) at the lower yardarm denotes 1 foot (0.3 m.).

Each small black ball (14 inches) at the lower yardarm denotes 3 inches (0.1 m.).

In addition to the above balls, a white flag hoisted at the yardarm indicates that the water is rising and a blue ball indicates that it is falling. When neither the white flag nor the blue ball are shown the water is slack.

By night—

Each red light at the upper yardarm indicates 5 feet (1.5 m.).

Each white light at the lower yardarm indicates 1 foot (0.3 m.).

Parts of a foot are not indicated by night.

There are also tide gauges on either side of the first reach of the channel.

Vessels are not permitted to use the channel unless their draft is at least 6 inches less than the depth shown by signal or by the gauges.

**Storm signals** are shown at the pilot station on Pereboini Island and from the light vessel.

**Ice breakers.**—Two ice breakers are employed to keep the dredged entrance channel and river open, so far as possible, during the winter.

**Current.**—The current during the spring floods attains a rate of from 3 to 4 knots. In the summer and autumn the current is slight.

**Pilot station.**—The pilot station is situated on the northern side of Pereboini Island. There is a signal mast at the station and another for wireless, by means of which there is communication with the light vessel.

**Tugs** can be obtained to take vessels up to Rostov.

**Lifeboats.**—The light vessel is equipped with a lifeboat. There are several lifeboats at Rostov.

**Depths.**—Azov can be reached by a canal with a depth of 12 feet (3.7 m.) connecting the southern branch of the Don River, which is known as the Old Don, with the navigable channel from Rostov to the Egurcha mouth. The direct route to Taganrog Gulf by the Merinvoe mouth has a depth of only 4½ feet (1.4 m.).

**Azov.**—The ancient town of Azov, reduced at the present day to a village, stands about 1½ miles southward of the southern branch of the Don River and about 5 miles northeastward of Kagalnik, at the southern mouth of the river. The town and port are lighted by electricity.

It has a telegraph station and is connected by a branch line with the Russian railroad system. The principal industry is the export of grain, which is sent down by barges to Taganrog Road.

**Bridges.**—An iron railroad bridge crosses the river below Rostov on Don, and there are also two floating bridges. The railroad bridge has a movable span, which is opened several times daily.

Owing to the curve of the river it is sometimes difficult for vessels bound downstream to pass through the bridge, especially during strong winds. A barge painted white, with three masts, is moored above the central pier of the span to indicate the opening and to render assistance to vessels.

**Bridge signals.**—A red pennant by day and a red light by night hoisted at the forepeak indicates that the bridge is open.

**Storm signals** and depth signals are shown from the barge. See pages 33 and 345.

**ROSTOV-ON-DON** (*47° 10′ N., 39° 43′ E.*) is picturesquely situated on the elevated right bank of the Don 25 miles above the Egurcha entrance. It is the largest commercial town on the Sea of Azov and one of the most important on the south coast of Russia. In 1914 the population amounted to 204,875, and that of the adjacent town of Nakhichevan was 56,343. It is the principal terminus of three great railroads and the depot for all the produce of the rich territory between the Don and the Caucasus Mountains.

There is an electric railway service in the town.

Vessels berth at Rostov alongside the quay, where there is a depth of from 9 to 14 feet (2.7 to 4.3 m.); the total length of quayage at Rostov and Nakhichevan is nearly 2½ miles.

River steamers of light draft can navigate to Kalach, about 335 miles above Rostov.

**Marine railway.**—See Appendix I.

The Volga-Don repairing works, opposite Nakhichevan, undertake repairs to hull and machinery.

**Coal and supplies.**—About 24,000 tons of bituminous and anthracite coal are usually in stock. It is brought off to vessels in the river in lighters and steam barges. Fresh meat, vegetables, and bread can be obtained. Liquid fuel can be obtained.

**Trade.**—The Don Basin is 65,000 square miles in area, and contains coal, iron ore, salt, and mercury, and furnishes good crops of wheat, barley, and oats. Coal is found in an area of 16,000 square miles, and the output of bituminous and anthracite coal amounts to about 18,000,000 tons annually. The industries of Rostov are considerable, and comprise flour milling, iron smelting, wool washing, paper making, and the manufacure of cigarettes.

The exports consist of wheat and other grain, wool, tallow, etc. Agricultural machinery is one of the chief imports. There are two elevators in the port for loading grain.

There are a considerable number of tugs and barges employed in the river, as much grain is sent from Rostov for shipment in Taganrogski Road.

**Port regulations.**—See Appendix VI.

**Communication.**—There is railroad communication with Moscow; also with Taganrog and the general Russian system. To the southward there is communication with Novorossisk, on the Black Sea, and with Petrovsk and Baku, on the Caspian.

The Russian Steam Navigation Co. and the Volga-Don Steamship Co. maintain a regular service with Black Sea and Azov ports. There is telegraphic communication with all parts, and telephonic communication with Taganrog.

**Hospitals.**—There are hospitals in the town.

**Directions for Taganrog Gulf.**—In crossing the Sea of Azov attention should be given to the numerous wrecks shown on the charts, the depths in the fairway track being only about 40 feet (12.2 m.), mud bottom, and mud mixed with sand when within 10 miles of Berdyanskaya Kosa. The best course to be steered by vessels after clearing Kertch Strait, if bound for Taganrog, is about 8° for about 70 miles. Here a vessel should be in a position about midway between Berdyanskaya Kosa Lighthouse and the light buoy southeastward of it, or about 7 miles from either. Eastward of this track the water becomes shallower, and on approaching the shore the bottom is composed of reddish shells, but westward of the track the water is deeper and the bottom mud.

From the above position course should be altered to pass between Byelosarai Lighthouse and the light and bell buoy off the northwest extremity of Dolgaya Kosa, from whence, if bound to Mariupol, steer to the northward until the range marks for the dredged channel are in line.

Bound to Taganrog, follow the dotted line shown on the chart, passing northward of the black spar buoy northeastward of Dolgaya Kosa, and southward of the red light buoy southwestward of Krivaya Kosa, and thence northward of Peschani Light Vessel, moored northward of the Peschanie Islets flat. From abreast the light vessel the dotted track leads, in depths of 19 to 20 feet (5.8 to 6.1 m.) close northward of the guard ship (customs), with which vessels have to communicate, page 340, and near which vessels of above 17 feet draft should anchor.

Eastward of this the track passes southward of Byeglitski Light Vessel, northward of the black light buoy moored northward of Grecheskaya Bank, and southward and eastward of the red light buoy moored southward of Petrushina Kosa. Here the depths are from 15 to 17 feet (4.6 to 5.2 m.); vessels of less than 12 feet draft can proceed nearer to Taganrog or enter the dredged channel leading to the Egurcha mouth of the Don for Rostov.

**At night.**—The light buoys and light vessels are sufficient guides for the channel, and the dotted track should be followed as in the daytime.

**Return voyage.**—On the return voyage southward toward Kertch Strait it will be prudent in unsettled weather to steer a little westerly, to avoid the risk of being embayed on the low eastern shore with northwest winds, which are very prevalent in this sea. On nearing the strait three hills will be recognized, two of which are 6 miles west-northwest of Cape Yenikale, the third being the cape itself, which seen from a distance appears separated from the rest of the coast.

**Coast—Westward of Taganrog Gulf.**—From Byelosaraiskaya Kosa the coast trends northward and westward, forming a bay 7 miles wide between it and the village of Gurzuf, the depths in which are less than 18 feet (5.5 m.) for about 5 miles from its head, and extending about 2½ miles southwestward of Byelosaraiskaya Kosa beacon.

At the head of the bay is Yalta village, situated in a ravine, easily distinguished by its church and windmills.

Gurzuf or Zelenoe village lies 7 miles southwestward of Yalta, and is visible from seaward.

**From Yalta the coast**, which is bordered by cliffs of a reddish color, trends for 18 miles in a southwesterly direction to the Berda River, the entrance to which is sometimes barred by a sand bank. On the northeastern side of the river stands the fort and village of Petrovskaya; a church in the village, with five cupolas and surrounded by white buildings, is conspicuous from seaward. From Petrovskaya the coast continues its southwesterly direction for 12 miles to Berdyanskaya Kosa.

**Anchorages.**—Small vessels can find shelter from easterly and northeasterly winds in the southern part of the bay, between Byelosaraiskaya Kosa and Yalta, in a depth of about 18 feet (5.5 m.) at 2½ miles to the westward of Byelosarai Lighthouse.

Anchorage will also be found in a depth of about 22 feet (6.7 m.) off Berda River, with the fortress distant about 2 miles.

**Vesuvius Rocks** (*46° 52′ N., 37° 08′ E.*) two in number, with depths of 3 and 9 feet (0.9 and 2.7 m.) over them, respectively, lie 8 miles to the southwestward of Yalta; the outer, with 9 feet (2.7 m.), is nearly 2 miles from the shore.

**Berdyanskaya Kosa** is the termination of a sandy peninsula 7 miles in length extending southward from the town of Berdyansk and protecting the roadstead from northerly and easterly winds. Near the center of the peninsula it is in some places only about 200 yards wide; it is often submerged in the spring and after fresh winds from between east and south-southeast. On the western side of the spit are two small coves which are used by coasters to winter in.

Westward of the point, southwestward of the town, the 3-fathoms (5.5 m.) curve is 4½ miles offshore.

**Wreck—Buoy.**—A sunken wreck marked by a black and white checkered spar buoy with ball top mark lies 6.9 miles 71° from Lower Berdyansk Light.

**Lower Berdyansk Light** (*46° 38′ N., 36° 48′ E.*), flashing white, 78 feet (23.8 m.) above the sea, visible 14 miles, is shown from a white octagonal tower with red horizontal band, 79 feet (24.1 m.) in height, situated about 200 yards within the extremity of Berdyanskaya Kosa. (See Light List.)

**A fog signal** is made by a foghorn from March 14 to December 14.

**Buoys.**—Two red spar buoys with inverted cone top marks, in about 4 fathoms (7.3 m.), and two similar buoys in the same depth, mark the southern and western edges, respectively, of the flat extending off Berdyanskaya Kosa.

**Wreck.**—A sunken wreck lies about 1½ miles 279° from Lower Berdyansk Lighthouse.

**Life-saving station.**—There is a life-saving station with lifeboat on the point near the lighthouse.

**BERDYANSKI ROAD.**—Between Berdyanskaya Kosa and the coast to the northwestward is a bay 10 miles wide, at the head of which is the town of Berdyansk. This bay affords anchorage in depths of from 15 to 21 feet (4.6 to 6.4 m.), bottom of soft mud with shells, or sand and mud.

This roadstead is open earlier and later in the season than that of Taganrog, and is sheltered from northwest to northeast. Winds from these quarters will lower the level of the water by as much as 1½ feet (0.5 m.).

Southwesterly winds, which blow frequently in the summer, raise an uncomfortable swell in the anchorage. This wind usually commences about midday and blows in gusts, moderating toward evening.

Vessels in the roadstead should therefore utilize the forenoon for shipping cargo.

**Upper Berdyansk Light** shows two vertical fixed white lights, 165 feet (50.3 m.) above the sea, visible 19 miles, from a white square tower on keeper's dwelling, 46 feet (14 m.) in height, situated at the northwest extremity of the town. (See Light List.)

**Wreck—Buoy.**—A wreck with a depth of 11 feet (3.4 m.) over it lies in the roadstead about 2.7 miles 35° from Upper Berdyansk Light. It is marked by a black and white checkered buoy.

**Dredged channel.**—The dredged channel leads up to the harbor westward of the breakwater. This channel has (1925) a depth of 15 feet (4.6 m.).

**Range lights.**—The front light, fixed red, 38 feet (11.6 m.) above the sea, is shown from a black triangular beacon with triangular top mark, 39 feet (11.9 m.) in height, situated on the beach in front of the town.

The rear light, fixed white, 158 feet (48.2 m.) above the sea, is shown from a red beacon with disk, 39 feet (11.9 m.) in height, situated 1,350 yards 40° from the front light.

These lights in range, 40°, lead through the dredged channel.

**Harbor lights.**—A fixed green light, 31 feet (9.4 m.) above the sea, visible 3 miles, is shown from a green hut, 12 feet (3.7 m.) in height, situated on the northwest end of the breakwater.

A fixed red light, 31 feet (9.4 m.) above the sea, visible 3 miles, is shown from a red hut 12 feet (3.7 m.) in height, situated on the southeast end of the breakwater.

A fixed white light, 15 feet (4.6 m.) above the sea, visible 4 miles, is shown from a mast with red lantern, situated on the outer end of Berdyansk Mole.

**A fog signal** is made by a bell at the southeastern end of the breakwater.

**Beacon.**—A red triangular beacon with a disk top mark, 39 feet (11.9 m.) in height, is situated 70 yards from the rear range light beacon on the line of the range lights.

**Buoys.**—The channel is marked by spar buoys.

**Directions.**—Vessels of more than 10 feet draft approaching Berdyanski Road should pass about 2 miles westward of Lower Berdyansk Light and steer in for Upper Berdyansk light tower or light on about a 30° bearing.

**Harbor.**—A detached breakwater 700 yards in length and about ½ mile from the coast line in front of the town affords shelter from the southward and westward.

A mole about 600 yards in length, connected with the railroad, extends from the town abreast the northern end of the breakwater, protecting the harbor from northwesterly winds.

The port is usually open from about March 23 to December 23, annually, and frequently for the whole year.

**Depths.**—The depths in the harbor are from 17 to 18 feet (5.2 to 5.5 m.).

The outer harbor is to be dredged to 24 feet (7.3 m.). The eastern quay of the inner harbor will be 1,260 feet long by 315 feet broad.

**Regulations.**—Steam vessels must pass by the steam dredger at a very slow speed, in order that the wash may not hinder the progress of the work.

In positions indicated by a red flag or lantern vessels must stop their engines in good time and not start them again until these positions are passed.

**Storm signals** are shown at the head of the western mole. See page 33.

**Pilots.**—There is a pilots' association at Berdyansk. The pilots berth vessels in the harbor.

**BERDYANSK** (*46° 45′ N., 36° 49′ E.*).—This town, with an estimated population in 1912 of 28,000 inhabitants, stands near the head of the bay at a short distance from the bold table-land which backs it. The town is regularly built, with wide, straight streets, and is surrounded by gardens. The Kutse Berdyanka rivulet, which is dry in summer, flows into the sea 4 miles westward of the town.

**Trade.**—The trade of the port consists in the export of grain and agricultural machinery. The imports are inconsiderable.

**Communication.**—The steamers of the Russian Steam Navigation Co. and of the Volga-Don Steamship Co. maintain an almost daily service in the summer with other ports of the Sea of Azov and Kertch, and with Theodosia three times weekly. Railroad communication with all parts of Europe; also telegrapic communication.

**Repairs** to small machinery can be effected.

**Coal and supplies.**—Coal is not kept in stock for supplying shipping. It can be obtained by rail as required. Vessels coal at the wharf, where there is a depth of 8 feet (2.4 m.). Supplies of all kinds can be purchased. Water is not good and is expensive.

**The coast** from Berdyansk is bold and cliffy, and trends westward and southwestward past Obitochnoe for a distance of 19 miles, to the commencement of a very narrow tongue of land extending a further distance of 14 miles, forming a natural breakwater for the bay westward of it, the extremity of which is known as Obitochnaya Kosa. At the inner end of the spit is a rounded point, above which on higher land are six hillocks in range, which form a good landmark and can be seen from a distance of 13 miles. The sandy flat fronting this shore extends 3 miles off in places within the 3-fathom (5.5 m.) curve, with small patches of 18 feet (5.5 m.) in places outside the curve, the outermost being 7 miles from the shore, and the depths generally are very uneven within the 5-fathom (9.1 m.) curve.

The bay to the northward and westward of Obitochnaya Kosa Beacon, below mentioned, is fronted by a sandy flat which, at the head of the bay, extends out about 3½ miles to the 3-fathom (5.5 m.) curve.

**Obitochnoe village**, with those of Nogaisk and Borisovka, is situated near the coast at 15 miles westward of Berdyansk.

**Pier.**—A pier for the use of coasting vessels is situated at Obitochnoe. Close to it are some brickworks.

**Light.**—An occasional fixed white light 42 feet (12.8 m.) above the sea, is shown from a white wooden post 41 feet (12.3 m.) in height, situated southeastward of Nogaisk. It is shown only when vessels are working cargo at the pier.

**Obitochnaya Kosa—Beacon** (*46° 29′ N., 36° 09′ E.*).—A black mast surmounted by a triangle with base upward, 58 feet (17.7 m.) above the level of the sea, is erected at the southwest extremity of Obitochnaya Kosa.

A flat with depths of 10 to 17 feet (3 to 5.2 m.) extends 6 miles south-southeastward of the beacon, with depths of about 4 fathoms (7.3 m.) on either side.

**Buoys.**—Two red conical buoys, each with an inverted cone top mark, are moored in a depth of about 4 fathoms (7.3 m.) at 1½ miles south-southeastward of the end of the flat at a distance of 7½ miles from the beacon.

A red spar buoy with inverted cone top mark is moored close to the conical buoy.

**Anchorage.**—The bay to the northward and westward of Obitochnaya Kosa beacon affords good shelter from easterly, northeasterly, and northwesterly winds.

The Solenaya rivulet flows through a ravine into the head of this bay.

**A patch** of 16 feet (4.9 m.), with depths of 27 to 28 feet (8.2 to 8.5 m.) around it, lies in the approach to this bay at 12 miles westward of Obitochnaya Kosa Beacon and 8½ miles southeastward of Nova Konstantinovka, on the western shore.

**The coast** from the mouth of the Solenaya trends west and southwestward for 40 miles to Thedotova Point, on which stands the villages of Kirilovka and Gorilaya, and several windmills.

The point is preceded by a sandy isthmus to the northeastward, about 6 miles in length, which separates Molochne Liman, into which the little river Molochnaya flows, from the sea.

On the rising ground at the northeast end of the sandy shore is the village of Stepanovka, with a church; 10 miles northeastward of the village is a remarkable hillock surmounted by a pillar, near which is the village of Nova Konstantinovka.

**Shoal.**—At the distance of 3½ miles off Kirilovka lies the center of a shoal of 16 feet (4.9 m.), which extends in a northeast and opposite direction a distance of 4 miles; the locality is only sparsely sounded.

**Thedotova Kosa,** the westernmost spit on the northern shore of the sea, extends from Thedotova Point a distance of about 23 miles southwestward, preserving the breadth of about ¼ mile for 13½ miles, when it widens out and is known as Biryuchi Island, the eastern coast of which trends southwestward for 12 miles to Biryuchi Spit, its southwest extremity; thence the coast trends northeastward 4 miles to Stagshorn Point, where the island is 3 miles wide.

A small table-land on which there is a farm is situated on the spit 4 miles southward from Kirilovka, and at 11 miles from the same village is a boat channel leading into the bay westward of it.

**Biryuchi Spit Light** (*46° 05′ N., 35° 02′ E.*), fixed white, 85 feet (25.9 m.) above the sea, visible 15 miles, is shown from a circular white masonry tower 90 feet (27.4 m.) in height, situated near the southwest extremity of Biryuchi Spit.

**Beacons.**—A black pyramidal beacon surmounted by a rectangular top mark, 75 feet (22.9 m.) above the sea, has been erected about 5 miles northeastward of Biryuchi Lighthouse.

A black mast beacon with supports, surmounted by a ball, 65 feet (19.8 m.) above the sea, is situated 11½ miles northeastward of Biryuchi Lighthouse and at 2 miles southward of the opening. These serve to mark the low-lying land.

**Genichesk approach—Shoals—Northern side.**—A 21-foot (6.4 m.) patch lies 9 miles, 90°, from Biryuchi southern beacon. Between this patch and a long, narrow 21-foot (6.4 m.) shoal situated 3 miles north-northwestward of it are two patches with 21 and 22 feet (6.4 and 6.7 m.) over them, respectively.

**Southern side.**—A recent survey, not yet completed, has revealed the existence of a number of shoals with from 18 to 21 feet (5.5 to 5.8 m.) of water, situated between 12 miles, 110°, and 19 miles, 148°, from Biryuchi Lighthouse.

Further southward a flat with depths of from 2 to 3 fathoms (3.7 to 5.5 m.) extends 5 miles seaward from the beacon on the Tonka, and two shoals with 18 and 19 feet (5.5 and 5.8 m.) lie, respectively, 15 miles, 78°, and 11 miles, 9°, from the same beacon. The bottom within the 5-fathom (9.1 m.) curve is very uneven throughout the extent of the Tonka.

**Buoys.**—A red conical buoy and a red spar buoy, each with inverted cone as top mark, lie on the southeastern side of the shoals on the north side of the approach at a distance of 16 miles, east by north from Biryuchi Lighthouse.

A black spar buoy with conical top mark is moored on the northern extremity of the shoals at a distance of 12 miles east-southeastward from Biryuchi Lighthouse.

Two black spar buoys with conical top marks are moored at a distance of 17 miles east-southeast from Biryuchi Lighthouse, to mark the northern extremity of the newly discovered shoals.

**Caution.**—Vessels bound to Genichesk from Kertch Strait or the ports in the Sea of Azov are recommended to pass to the eastward and northward of the black buoys mentioned above.

**GULF OF GENICHESKI.**—This gulf, the upper part of which is known as Utlyukski Liman, lies between Thedotova Kosa and the tableland which terminates at Genichesk. It is about 25 miles in length in a northeasterly direction, with a greatest breadth of about 7 miles.

The entrance, which is about 6 miles wide but contracted to 3 miles by the bank extending westward from Biryuchi Island, has a navigable depth of 22 feet (6.7 m.). Thence the depth gradually decreases to 13 feet (4 m.) westward of Kirilovka, a distance of 20 miles, from which position the water gradually shoals to the head of the inlet.

On the western shore, abreast Stagshorn Point, is the town of Genichesk. Northeastward of the latter are the villages of Stokopani and Yuzkuya.

**Shoals.**—A flat of sand and mud, with depths of 1 to 3 fathoms (1.8 to 5.5 m.) extends 3 miles westward of Biriuchi Lighthouse, on the eastern side of the entrance.

A similar flat extends 2 miles eastward of the town of Genichesk.

**Buoy.**—A red conical buoy marks the 2-fathom (3.7 m.) curve of the flat off Genichesk at about 1.1 miles eastward of the entrance to Genicheski Strait and near the fairway over the bar; the 1-fathom (1.8 m.) curve is about 500 yards within this buoy.

**Light.**—Two vertical fixed red lights, 70 feet (21.3 m.) above the sea, visible 14 miles, are shown from a quadrangular white tower with house attached, 51 feet (15.5 m.) in height, situated northward of the town of Genichesk.

**Winds.**—Northeasterly winds prevail in the winter, while from April to September the northeast wind usually blows in the morning, veers to the southeast during the day, and changes to the west in the evening.

**Anchorage.**—There is a very good anchorage, where vessels load from lighters, between Genichesk and Biryuchi Spit in 18 to 21 feet (5.5 to 6.4 m.) water, over a muddy bottom, at about midway between the two shores and open only to southward.

**Directions.**—When entering the gulf for Genicheski Roadstead the lighthouse at Genichesk kept on a bearing of about 333°, or at night with vertical red lights in sight, leads clear of all dangers.

**Pilots.**—Pilotage is not compulsory. Pilots can be obtained at Kertch if required. There are no fixed pilotage charges.

**Genicheski Strait** (*46° 10′ N., 34° 52′ E.*).—The entrance to the Sivash or Putrid Sea through Genicheski Strait, which lies close southward of the town, is formed between the southern bold table-land which borders the northern shore of this sea and the northern extremity of the Arabetskaya Stryelka (Tonka of Arabat), which separates the Sivash Sea from the Sea of Azov. The strait is about 150 yards broad, and deepened to 10, 12, and 15 feet (3, 3.7 and 4.6 m.) by the current to which it gives a passage, and the channel over the bar at its entrance has been dredged to a depth of 12 feet (3.7 m.). A railroad bridge crosses the Sivash at 9 miles westward of Genichesk.

**Arabatski Point Range Lights.**—The front light, fixed green, 34 feet (10.4 m.) above the sea, is shown from a gray pillar with red triangular top mark, 31 feet (9.4 m.) in height, situated on the north extremity of Arabatski Point.

The rear light, fixed red, 58 feet (17.7 m.) above the sea, is shown from a gray pillar with red triangular top mark, 60 feet (18.3 m.) in height, bearing 260° from the front light.

These beacons in range, 260°, lead over the bar, but they are only useful to small local craft.

**Lights.**—White lights are shown on the piers at Genichesk when cargo is being worked.

**Buoys.**—The channel over the bar of Genicheski Strait is marked by black spar buoys on the starboard hand and by red spar buoys on the port hand, entering, and by a red spar buoy at the entrance.

The red conical buoy before mentioned lies close southward of the bar range line, at the entrance.

**Current.**—The current in the strait, which is caused by the winds blowing from the Sea of Azov or from the Sivash Sea, attains a velocity of 3½ knots, at times 5 knots.

**Water level.**—The usual variation in the water level in the strait and roadstead, due to the wind, does not exceed 1 foot (0.3 m.).

The maximum fall of the water is as much as 3 feet (0.9 m.), and the maximum rise, during easterly gales, reaches 4 feet (1.2 m.).

**Storm signals** are shown at Genichesk. See page 33.

**GENICHESK.**—The town of Genichesk, which contains a population of about 7,000, is situated on the northern shore of the strait. A church which has two domes is conspicuous from seaward, and to the northward of it and also on the sky line, is a conspicuous factory with chimney.

On the southern side of the town is a pier connected with the railroad at which barges of 8 to 10 feet draft load or discharge cargo.

**Supplies.**—Water of good quality can be obtained at the piers. Provisions can always be obtained. Coal is not kept in stock for supplying shipping.

**Trade.**—The exports consist of grain, principally wheat, barley, and rye, and salt from the Sivash.

**Communication.**—Genichesk is connected with the Russian railroad system. There is communication with Kertch during the summer once or twice weekly by the vessels of the Volga-Don Steamship Co., and telegraphic communication with all parts.

**Hospital.**—There is a hospital in the town to which seamen are admitted.

**The Sivash (Gniloe) or Putrid Sea** is divided into two irregular gulfs or branches, one of which runs westward to the isthmus of Perekop and the other extends southeastward toward the Gulf of Theodosia, receiving the waters of several rivulets from the Krimea. The whole of this part is very shallow, even for boats.

**Coast—The Tonka** of Arabat is the western boundary of the Sea of Azov, separating it from the Sivash. It is very low and narrow sand strip 60 miles in length, curving slightly south-southeastward from Genichesk to Arabatski Fort. The shore on its eastern side is higher than that on the western, from the quantity of sand that has been washed up by the sea almost on an even line. On the inner side, however, it is very uneven and formed of earth. Its breadth is irregular, the narrowest part being ½ mile across. A post road runs along it and there are several wells of fresh water.

At 4 miles southward from Genicheski Strait is a tank house on the Tonka which forms a good mark.

For shoals off this coast and caution regarding them, see page 353.

**Beacon.**—A black mast beacon with supports and triangular top mark, 60 feet (18.3 m.) in height, is erected on the Tonka in latitude 45° 36′ N., abreast the flat which extends 5 miles offshore.

**Arabatski Bay and Fort.**—The ancient fortress of Arabat stands near the southern extremity of the Tonka, at the head of Arabatski Bay. Amidst the ruins of the fort is a mosque of brownstone with domed roof, about 50 feet (15.2 m.) high, which is conspicuous from seaward. Vessels visit this bay to load salt. The bay is much exposed to northwest to northeast winds. Winds from the north and northeast send in much sea, which prevents all communication with the shore.

**Anchorage.**—The depths in the bay diminish gradually toward the shore. The best anchorage is in 25 feet (7.6 m.), bottom mud and shells, about 2½ miles northward of the village. Near the shore the bottom is sandy.

**Akmanai** (*45° 16′ N., 35° 34′ E.*).—Two miles eastward of the fort, on high ground, is the large Tartar village of Akmanai. Good water can be obtained from the wells situated about 200 yards from the shore.

**Coast.**—The sandy coast terminates at Arabat, bending round east-northeast for 13 miles to Kiten Point. It then trends northeastward for 7 miles to Kazantip Point, which forms the northern extremity of a peninsula projecting into the sea from the Krimea.

**Kazantip anchorage.**—Kazantip Point is rocky, of moderate height, bold to approach, and its eastern extremity affords shelter against north and northwest winds in from 15 to 20 feet (4.6 to 6.1 m.) water, over a muddy bottom; but the Wrangler patch of 10 feet (3 m.), lying southeastward 1 mile from the east point, must be avoided.

Northward of Kazantip the 5-fathom (9.1 m.) curve is about 3½ miles from the coast.

When approaching this anchorage the summits on Kazantip Point, being separated from the shore to the southward by a low, sandy neck, appear as two islands and form a good mark for recognizing the bay.

**Chagani Point** (*45° 27′ N., 36° 06′ E.*), recognizable by the numerous summits on it, two of which are higher than the others, lies 9 miles eastward of Kazantip Point, and between them the coast falls back 5 miles, forming a deep bay known as Kazantipski Bay, having a depth of 25 feets (7.6 m.), over a muddy bottom, 1 mile from the shore. It is bordered by a beach and exposed to northerly winds.

There is anchorage in the southeastern part of the bay in a depth of 30 feet (9.1 m.) off the village of Adzhubai.

From Chagani Point the coast trends to the eastward, and as far as Kertch Strait is backed by hills.

**Bagatubi Point,** nearly 9 miles eastward of Chagani, the coast between being low and rocky, is high and within it is the salt lake named Chokrakskoe. From thence the coast bends to southeastward, and about 2 miles farther on is Zyuk Point, a small elevation, steep and rocky on its seaward side and sloping gently toward the shore, connected to the mainland by a strip of sand.

**Banks.**—Betwen Chagani and Bagatubi Points a gravel bank with depths under 5 fathoms (9.1 m.) fronts the coast for about 3½ miles; off Bagatubi Point, distant 1¾ miles, is a patch of 15 feet (4.6 m.).

From Zyuk Point a shoal spit extends in a northwesterly direction for a distance of about 3 miles, with a 2½-fathom (4.6 m.) patch lying near its outer end.

**Tarkhan Point,** a round bluff headland, lies 4½ miles eastward from Zyuk Point, the bay between them being filled by a rocky bank with depths under 2 fathoms (3.7 m.). The village of Bolshoi Tarkhan is situated in a bight on the western side of the point.

Two groups of mud volcanoes are situated near the point.

**Cape Khroni** (*45° 26′ N., 36° 36′ E.*) lies 6 miles 101° from Tarkhan Point, and between them the coast recedes, forming a bay in which a depth of from 28 to 30 feet (8.5 to 9.1 m.) will be found 1 mile from the shore. The cape slopes down from a high, steep coast and is covered with large gray rocks, which render it easily distinguishable when seen from the northward. Inland, above the cape. will be seen Mounts Khronya and Temir. The first forms a long ridge with a cleft summit on its eastern extremity. The second, situated farther westward, has a rounded regular summit. Between these hills are other and lower hills.

There is a spoil ground off the cape, marked by buoys mentioned with Kertch Strait.

From Cape Khroni the coast trends southeastward for 5 miles to Cape Yenikale and forms the western shore of the entrance to Kertch Strait. See page 317.

# CHAPTER VIII

## BLACK SEA—CAUCASIAN OR EASTERN SHORE; KERTCH STRAIT TO BATUM

**CAUCASIAN COAST.—General remarks.**—The Caucasian littoral, or "Russian Riviera," as it has been called, extends from Anapa to Batum, a distance of about 300 miles, and varies, according as the mountains recede from or approach the sea, from 15 to 100 miles in breadth, and is watered by many streams and rivulets. The great mountain system, rising near Tuapse to a height of 6,000 to 7,000 feet (1,828.8 to 2,133.6 m.) diverges from the sea as it trends southward. The northern part of the coast is semicontinental in climate, whereas the southern part enjoys an entirely maritime climate and is distinguished for the amount of its rainfall in the summer months. There is a great wealth of forest on this part of the Black Sea coast. The Caucasian littoral is generally unsuitable for cereals, but is ideal for the cultivation of fruit, vines, and tobacco. Tea is also successfully cultivated.

**Coast.**—The coast from Zhelyezni Rog (Cape Kishla), consisting of steep reddish cliffs, trends eastward for a distance of 5 miles to abreast of a salt lake; thence it is low and sandy to the entrance to Kuban Lake, and is fronted throughout its extent by foul ground to the distance of ½ mile.

**Kiziltashski (Kuban) Liman.**—The channel leading into Kuban Liman is formed between Bugaz Point, the extremity of a narrow sandy projection extending ¾ mile southeastward from Taman Island, and the northwest point of Timiteia Peninsula. It is about 400 yards broad and has a depth of 8 to 13 feet (2.4 to 4 m.), but seaward of the entrance there is a bar with but 2 feet (0.6 m.). There is a strong current in the entrance channel with offshore winds. The lake is only navigable by flat-bottomed boats. On Bugaz Point stands a large building and the village of that name, and there are several houses on the point of Timiteia Peninsula.

**Foul ground.**—In standing toward the entrance from the westward care must be taken to guard against the foul ground which extends fully 3 miles southward from Cape Kishla.

**Mari Magdalini Rock** (*45° 03′ N., 37° 00′ E.*)—This dangerous rock, with a depth of 4 feet (1.2 m.), lies nearly 5 miles southeast of the entrance to Kuban Liman Channel and 1¾ miles from the shore of Timiteia Peninsula. There is a depth of 15 feet (4.6 m.) at ¼ mile southeast of the shallow heads and 10 fathoms (18.3 m.) ½ mile distant. Between the rock and the shore there is a depth of about 5 fathoms (9.1 m.).

**Buoy.**—A red spar buoy with inverted cone as topmark has been established in a depth of 6 fathoms (11 m.) on the southwestern side of this rock at a distance of about 800 yards from the shoalest head.

**Beacons.**—Two beacons on the shore serve as marks for Mari Magdalini Rock.

These beacons are formed by columns with supports, painted black, the front beacon, situated on Timiteia Peninsula, being 36 feet (11 m.) in height and surmounted by an inverted triangle, the rear beacon of the same height, situated northeastward, distant 420 feet, 58°, from the front beacon, being surmounted by an upright triangle. The tops of the beacons are respectively 41 and 52 feet (12.5 and 15.8 m.) above the sea.

These beacons in range point out the position of the rock.

**Direction.**—Cape Panaghya open of Cape Kishla, 294°, leads southward of the rock.

**Blago Vyeshekenskskaya Kosa (Timiteia Peninsula).**—The peninsula of Timiteia, about 15 miles in length, serves as a dyke to the waters of Kuban and Vityazevski Lakes. It trends in an east-southeast direction from Bugazskoe Girlo (Bugaz Channel), and toward its middle rises to a slight ridge about 3 miles in length, the sides of which are steep and of a reddish tint. About 11 miles from the Bugaz Channel is the village of Stora Blagovyeshchenskaya and the fort of Timiteia, now in ruins. There is a depth of about 4 fathoms (7.3 m.) along the peninsula about ½ mile from the shore, but great attention must be paid, especially during light and variable winds, as the current, which generally sets to northwestward along the Caucasian coats, sets here toward the land.

Beyond the coast guard station at the southeastern end of the peninsula there are several hills, the highest of which is Otzokutan, 336 feet (102.4 m.) high; fronting them is a plain bordered by a sandy beach, which trends round to the southwestward and forms the roadstead of Anapa. The western point of the roadstead, on which stands the town, is comparatively low and flat.

**ANAPA ROAD—Banks.**—A rocky flat borders the shore, extending from 700 to 800 yards northward of the town, with patches of 8 feet (2.4 m.) within its edge; it continues northwestward and westward of the town to a less distance.

**Buoys.**—The northern side of the 8-foot (2.4 m.) bank is marked by two black spar buoys with conical top marks; one is moored just northward of the shallow heads and the other in 7 fathoms (12.8 m.) at ½ mile northwest of the pier. A similar buoy in a depth of 6 fathoms (11 m.) marks the foul ground extending westward of Anapski Point.

**Lights.**—A flashing white light, with red sector, 132 feet (40.2 m.) above the sea, visible 17 miles, is shown from a square white stone tower 69 feet (21 m.) in height, situated near the southern angle of the town wall.

A fixed green light, 50 feet (15.2 m.) above the sea, is shown from a square stone tower painted gray with yellow gallery, 37 feet (11.3 m.) in height, situated near the pier.

A green light is shown from the pier when vessels of the Russian Steam Navigation Co. are expected.

**Range lights.**—The front light, fixed red, 40 feet (12.2 m.) above the sea, visible 4 miles, is shown from a pyramidal-shaped iron framework structure on a square white stone base, 47 feet (14.3 m.) in height, situated northeast of the town.

The rear light, fixed white, 68 feet (20.7 m.) above the sea, visible 7 miles, is shown from a structure similar to that of the front light, 58 feet (17.7 m.) in height, situated 373 yards 120° from the front light.

These lights in range 120° are only shown when vessels of the Russian Steam Navigation Co. are expected.

**Anchorage.**—The best anchorage is in the outer road in about 5½ fathoms (10.1 m.) mud and sand, with the white tower of the disused lighthouse on the northwest point of the town bearing 205°, about 1,200 yards; but this is exposed from northwest to south-southwest. More to the westward the bottom is mixed with gravel.

The inner anchorage, in about 2 fathoms (3.7 m.) for small craft, southeastward of the rocky patches, is sheltered from southwesterly winds and also protected from the sea by the foul ground. It may be entered by the channel southward of the foul ground, in which there is a depth of 2½ fathoms (4.6 m.), or by passing northward and eastward of the foul area.

Small vessels must be careful in standing inshore, for ¼ mile northeastward of the town a bar of sand is formed in the summer season off the mouth of Kumalir River.

**Storm signals** are shown from a flagstaff near the guardhouse. See page 33.

**Directions.**—In coming from the southward Anapa may be easily recognized by the diminished height of the mountains in its vicinity and by a long white cliff which extends to the walls of the town, but in the approach from the westward is not so easily made out. In standing for the anchorage from the southward a vessel should give Anapski Point a berth of at least 800 yards, to avoid a rocky flat which borders it.

When coming from the westward or northwestward the range beacons bearing 121° lead to the outer anchorage. If bound to the inner anchorage the gray tower near the pier in range with the pierhead, 187°, leads from the above range eastward of the rocky flat in a depth of about 11 feet (3.4 m.).

**ANAPA** (*44° 54′ N., 37° 19′ E.*).—The town of Anapa occupies the whole southern shore of the roadstead. It stands on a projecting crag of a long slope from the most western mountains of Circassia. The houses are generally of one story and the streets are wide and straight. The principal church in the town is built of stone and has a high tower which forms a good landmark. On the south and west sides the walls rise from a perpendicular calcareous rock nearly 200 feet (61 m.) in height, but on the north the land slopes toward the roadstead. Southeastward of the town are numerous windmills.

The population was estimated at 10,530 in 1912.

**Pier.**—A pier 175 yards in length extends from the northern shore of the town and has depths of from 7 to 12 feet (2.1 to 3.7 m.) alongside and 14 feet (4.3 m.) at its outer end.

**Supplies** are scarce, especially in summer. Water is brought in barrels from the Kumalir River.

**Trade.**—Formerly a very considerable commerce was carried on at Anapa with the Circassians, which consisted of wheat, rye, butter, furs, wax, and staves.

**Communication.**—There is regular steamer communication with Odessa and Batum and intermediate ports three times a week; also telegraphic communication with all parts.

**Coast.**—From Anapa the coast trends south-southeastward and gradually becomes higher. At 5 miles to the southward is a steep white cliff, the base of which is washed by the sea. This coast is steep-to, having a depth of 8 fathoms (14.6 m.) 500 yards from the shore.

**Utrish Point** (*44° 45½′ N., 37° 24′ E.*).—About 8½ miles southward of Anapa, between two high reddish cliffs, is a hill about 200 yards in length, covered with brushwood, the extremity of which is named Utrish Point. When seen from the north or south it appears like an island and has often been taken for one, being connected to the mainland by a low isthmus 400 yards in length, destitute of vegetation. The point is bordered by a shoal extending about 400 yards within the 5-fathom (9.1 m.) curve. The flat extends 600 yards northward of the point, with a patch of 17 feet (5.2 m.) on it at 500 yards northward of the point; the northern part drops suddenly into deep water on both sides.

**Utrish Point Light,** flashing green, 50 feet (15.2 m.) above the sea, visible 6 miles, is shown from a white hut on an iron trestle 18 feet (5.5 m.) in height, situated on the extremity of Utrish Point.

**Anchorage.**—Small craft may obtain shelter from southerly winds in the cove to the northward of the point and from northerly winds in the cove to the southward by anchoring close to the isthmus in 5 or 6 fathoms (9.1 or 11 m.). The shore bank is steep-to

**Utrishenok (Utrishonok) Point.**—To the southward of the two reddish cliffs which back Utrish Point is seen a third cliff, and then a low wooded shore backed by mountains as far as Utrishenok Point, which has also the appearance of an island when seen at a short distance from the coast.

**Sampson (Pribezhni) Rock,** with a depth of 2½ fathoms (4.6 m.), lies abreast of Utrishenok Point at ½ mile off.

**Reported rock.**—The master of the Austrian steamer *Elenia* reported in 1908 that when about 2 miles southward of this point his vessel struck upon an obstruction.

The Greek steamer *Georgios Emberikos* is also reported to have struck upon a rock situated near the above position.

**Caution.**—Owing to the possibility of uncharted dangers, a berth of at least 3 miles should be given to the shore in the vicinity of Utrishenok Point.

Two patches, of 5 and 6 fathoms (9.1 and 11 m.), have been found at about 1 mile westward of the entrance to Dyurso River and 1 mile offshore.

**Coast.**—From Utrishenok Point the coast trends southeastward and eastward, and bold white cliffs reappear at the foot of conical mountains with round summits, separated from each other by narrow valleys. That of Dyurso is the most remarkable on account of its beauty. It is followed by another steep cliff and by a smaller one of angular form. The coast from thence trends more to the eastward, and a rich and picturesque valley comes in sight, which is inhabited and bordered by a beach slightly receding to the northward, forming Ozereik Roadstead.

**Ozereik anchorage.**—The anchorage off Ozereik, in 4 to 8 fathoms (7.3 to 14.6 m.), is sheltered from winds from west-northwest through north to east-southeast, with good holding ground 200 or 300 yards from the shore.

**Maskhak (Miskhak) Point** (*44° 39′ N., 37° 46′ E.*) is situated about 5 miles eastward of Ozereik, at the foot of a steep mountain. At its base, to the eastward, is the valley of Miskhak, abreast of which a vessel may anchor sheltered from all winds from west through north to east-northeast. The shore from thence is low and runs about 2 miles eastward to a small point, beyond which there is a lake and the low sandy point of Sudzhuk, which forms the western side of the entrance to Novorossisk Bay.

**NOVOROSSISK BAY (NOVOROSSIISKAYA BUKHTA).**—The entrance to Novorossisk Bay lies between Sudzhuk and Doob Points, which bear northwest by west and southeast by east from each other, distant nearly 4¾ miles. The bay is about 4 miles long in a northwest direction from Sudzhuk Point to the head of the harbor, which fronts a large wooded valley watered by Tsemes River, the waters of which rarely reach the sea. The bay never freezes.

**Sudzhuk Point** is low: thence the western shore of the bay is of moderate height, and 1 mile from Sudzhuk Point, to the northward of a salt lake, will be seen a ruined Turkish fort, while at the head of the bay is the harbor of Novorossisk, formed by two moles extending from the northeastern and southwestern shores, respectively. On the western side of the harbor is the town of Novorossisk.

**A reef,** consisting of detached patches with depths of 2 to 3 fathoms (3.7 to 5.5 m.) in places, extends southeastward from Sudzhuk Point for a distance of about 1,600 yards.

Northward of Sudzhuk Point 5 fathoms (9.1 m.) will be found from 200 to 600 yards from the shore.

**Doob Point** (*44° 38′ N., 37° 56′ E.*), the eastern point of entrance to Novorossisk Bay, near which stands a lighthouse, is remarkable, being surrounded by white angular cliffs and lying at the foot of Mount Doob, which is 1,498 feet (456.6 m.) high. A valley to the northward separates it from the ridge of the Varada Mountains, which rise to the height of 2,345 feet (714.7 m.) and border the bay to the northeastward. See Appendix IX, view S.

Kabardinski Fort stands at the head of a bay, 1½ miles northeastward from Doob Point. Northward of this bay the shore becomes bold and steep. Three miles northwestward of the fort is Penai Point, composed of steep cliffs, and on which also stands a lighthouse. Thence the coast trends in a northwesterly direction to the head of the bay, a distance of 5 miles.

**Shoals.**—In the bay northeastward of Doob Point, more than ¼ mile from the shore, is a reef about 500 yards in length from north to south with a least depth of 3 feet (0.9 m.), situated 292° distant 900 yards from the mouth of Doob River. In the bay to the southward of this shoal the 5-fathom (9.1 m.) curve is about 800 yards from, with gradually decreasing depths toward, the shore, but outside it there is a patch of 4½ fathoms (8.2 m.) which is nearly 600 yards south-southwestward from the depth of 3 feet (0.9 m.) already mentioned.

The northeastern shore of Novorossisk Bay within this bay is fringed by a flat which extends in places from 200 to 300 yards off and is fairly steep-to beyond the 5-fathom (9.1 m.) curve.

**Middle ground.**—In mid-channel and just within the entrance of the bay lies a bed of sunken rocks of irregular depths, which within the 10-fathom (18.3 m.) curve is nearly 1½ miles from north to south and 1¼ miles from east to west.

On its southeastern part is a patch named Penai Bank, about 700 yards in extent, with a least depth of 2¾ fathoms (5 m.), situated

207° distant 1.4 miles from Penai Point Lighthouse. A patch of 3 fathoms (5.5 m.), about 300 yards in length lies close to the westward of this position.

On the western edge of the middle ground is a patch with a least depth of 4¼ fathoms, 229° distant 1¾ miles from Penai Point Lighthouse, and in a south-southeast direction from this depth 400 yards is a patch of 4¾ fathoms (8.7 m.).

On the northern edge of the middle ground is Sheskari Rock, a patch of 3½ fathoms (6.4 m.), bearing 238° distant 1 mile from Penai Lighthouse.

A patch of foul ground (1919) is chartered about 800 yards westward of middle ground.

**Conspicuous objects.**—The following objects in the bay are conspicious: Radio masts northwestward of Sudzhuk Point, a spire at the head of the harbor northeastward of the piers, and a cement works tower eastward of the quarantine station.

**Range marks.**—A pyramidal white stone beacon, named Penaiski, when in range with Penai Point Light, bearing 57°, leads southward of Sudzhuk Point Reef. See Appendix IX, view T.

A pair of leading beacons, similar to the above-mentioned beacon and named Tsemesskie, situated at the head of the bay, kept in range, bearing 338°, lead up the center of the bay.

**Light and bell buoy.**—The southeast extremity of the shoals off Sudzhuk Point is marked by a light and bell buoy, painted red, exhibiting an occulting red light.

**Buoy.**—A black spar buoy with cone is moored on the western side of the 4¼-fathom (7.8 m.) patch on middle ground.

**Doob Point Light,** fixed white, 337 feet (102.7 m.) above the sea, visible 25 miles, is shown from a white octagonal stone tower 85 feet (25.9 m.) in height, situated about 600 yards southward of Doob Point.

**Penai Point Light,** fixed red, with alternating white and green sectors, 64 feet (19.5 m.) above the sea, visible 13 miles, is shown from a white house 36 feet (11 m.) in height, situated on Penai Point.

**Harbor lights.**—A fixed red and flashing white light, 43 feet (13.1 m.) above the sea, is shown from a white cylindrical iron tower 42 feet (12.8 m.) in height, situated on the east molehead.

A fixed red light 32 feet (9.8 m.) above the sea, is shown from a white iron post 24 feet (7.3 m.) in height, situated on west molehead.

A fixed green light is shown at the end of the coasting mole. Two occasional green lights are shown at the end of the passenger pier.

**A fog signal** is made by a bell at the east molehead.

**Anchorages.**—The anchorage off the town at the head of the bay is considered very dangerous during the autumn and winter months on account of the northeast winds which then prevail. See Winds, page 41.

Vessels waiting for berths at the piers anchor inside the moles as near the northeastern shore of the harbor as possible. If, owing to bad weather, they are unable to enter the harbor, the usual anchorage is near the northeastern shore of the bay in the bight formed by that shore and the eastern mole of the harbor.

There is also anchorage in the small bay northward of Doob Point, east side of entrance, in 5 to 10 fathoms (9.1 to 18.3 m.), over sand and mud, about ½ to ¾ mile from the shore.

In very hot weather the best anchorage is about ½ mile south-southwestward of the eastern mole light.

**Novorossisk Harbor** is protected by two moles. The eastern one extends in a southwesterly direction and is nearly ½ mile long; the western one extends from the town in an opposite direction for a little over ½ mile, leaving an entrance nearly 400 yards wide with a least depth of 35 feet (10.7 m.) between them.

**Regulations.**—The following traffic regulations are (1924) in force:

Vessels approaching from the westward or southward should steer for the alternating white and green sector of Penai Point Light and proceed in that sector until the flashing red sector of the east mole light opens, when they can proceed to the entrance of the harbor, where it is compulsory to take a pilot.

Vessels approaching from the southeastward should steer for the flashing red sector of the east mole light and proceed in that sector, a pilot being obtained before entering the harbor. Alternately, vessels should arrive on the parallel of latitude of Doob Point Lighthouse at a distance of not more than 1¼ miles from the lighthouse, and proceed thence in the southern fixed red sector of Penai Point Light until the fixed white narrow sector of Doob Point Light opens, when they can proceed to the entrance of the harbor, where it is compulsory to take a pilot.

**Wrecks—Caution.**—Numerous wrecks exist in the bay and harbor, many of which may not be charted. Vessels should proceed with caution.

**Directions.**—The direct route is by the channel between Sudzhuk Point Reef and the middle ground.

The pyramid within Penai Point in range with the lighthouse on that point, bearing 57°, leads in southward of Sudzhuk Point until the Tsemesskie beacons eastward of the harbor are coming in range bearing 338°, when alter course in good time and steer up the bay as requisite for the entrance to the harbor.

**At night.**—Approach in the northern alternating sector of Penai Point Light, bearing about 63°, until within the sector of light shown from the eastern mole, bearing 336°, which leads eastward of Sudzhuk Point Reef and buoy and westward of the middle ground. Steer up the bay in that sector of light and as requisite into the harbor.

The channel eastward of the middle ground, between it and the eastern shore, may be taken by steering in the southern red fixed sector of Penai Point Light, bearing about 2°, altering course in good time to steer up with the narrow sector of Doob Point astern, bearing 150°, which marks lead eastward and northeastward of the Middle Bank; when approaching the northern red fixed sector of the light on Penai Point steer to bring it astern, and keeping it thus (between the bearings of 114° and 126°) will lead toward the harbor until the light on the east molehead is sighted, when steer as requisite to enter the harbor.

Sailing vessels working in may find the eastern channel more convenient than that westward of the middle ground at times.

**Pilots.**—Pilotage is compulsory. An unlicensed pilot from the railroad company comes on board to take vessels alongside the piers.

The pilot station is now in the vicinity of Sudzhuk Point.

**NOVOROSSISK** (*44° 43′ N., 37° 48′ E.*) is of great commercial and industrial importance, and contained in the year 1922 a population of 100,000, due to the great influx of refugees. The Standard Petroleum Co. has its works and place of shipment on the northwestern side of the harbor, whither the bulk of the oil is brought by rail in tank cars from the Grozni oil fields, between Vladikavkaz and Petrovsk. The climate is healthy, except in the vicinity of Tsemes Valley, where malaria occurs in summer.

**Piers.**—On the northwestern shore of the harbor there are seven piers where vessels load and another under construction. Five of these piers belong to the railroad company, and have a depth of 24 feet (7.3 m.) alongside, one to the Standard Petroleum Co., with a depth of 20 feet (6.1 m.) at its outer end, and one, the northeasternmost, to the Russian Steam Navigation Co., with a depth of 24 feet (7.3 m.) at its outer end.

On the southwestern side of the harbor, in front of the town, is a wharf for the use of the coasting trade, which has a depth of 24 feet (7.3 m.) at its outer end and a dredged area on either side of it with nearly the same depth.

The piers are furnished with cranes, and there are two floating cranes of 25 and 40 tons, respectively.

The Black Sea Cement Works, on the eastern side of the harbor, have a quay on which is a large ferro-concrete structure capable of storing 100,000 barrels of cement. Large steamers go alongside and are loaded by a powerful crane. The quay has a depth of 23 feet (7 m.) alongside and the jetty of the cement works has a depth of 30 feet at its outer end. A four-truck aerial with suspended cars connects the depot with both sections of the works. The united works are capable of turning out about 250,000 tons of cement annually. A basin is under construction westward of the jetty and is nearly completed.

The basin is situated at the outer end of a broad mole and will be about 900 feet in length. When completed vessels will be able to berth on the outer side of the containing walls, where there are depths of from 30 to 36 feet (9.1 to 11 m.).

There are large warehouses for storing grain, and an automatic elevator with a storage capacity of 50,000 tons will receive grain, weigh, clean, and load it into steamers alongside.

**Floating dock.**—A floating dock is moored alongside the cement works jetty. (See Appendix I.)

**Repairs.**—There are workshops where repairs to the hulls and machinery of vessels can be effected.

**Supplies.**—Fresh meat, vegetables, and bread can be obtained. The water is not good.

Coal and liquid fuel are not kept in stock for supplying shipping. but the railway company keep about 2,000 tons in stock. The harbor jetties have a depth of about 24 feet (7.3 m.) alongside.

Fuel oil is supplied by pipe line at No. 5 Pier, at which the depth is 27 feet (8.2 m.).

**Trade.**—The principal articles of export are grain, mineral oil, and timber. The imports consist chiefly of ironware, coal, tiles, and fire bricks.

**Communication.**—By rail to Tikhoryetskaya Junction, on the Rostov and Vladikavkaz Railway; by steamer with the Black Sea ports by the Russian Steam Navigation Co.; by telegraph via Anapa with all parts.

**Hospital.**—Seamen are admitted to the town hospital.

**Quarantine.**—The quarantine station is not used. Vessels in quarantine must proceed to Theodosia.

**Coast.**—The long range of angular cliffs which border Doob Point is broken 4½ miles to the southeastward by Ashamba Creek, where also is the village of Natukhadi. The coast then trends more eastward, but gradually lessens in height as Gelenzhikskaya Bay is approached. A small reef extends about 150 yards westward from an angle of a cliff not far to the southward of Ashamba Point.

**GELENZHIKSKAYA BAY** (*44° 33′ N., 38° 04′ E.*)—The entrance to Gelenzhikskaya Bay is about 1 mile wide between Tliuvieuse Point, which is of moderate height, to the southeast and a low point to the northwest. A long range of white cliffs extends from Tolsti (Tliuvieuse) Point in a southeast direction toward Mezib.

The interior of Gelenzhikskaya Bay, oval shape, is about 2½ miles wide from northwest to southeast and 1½ miles long. It has a depth of 8 fathoms (14.6 m.) at its entrance and 5 to 6 fathoms (9.1 to 11 m.) in the middle, over sand and mud, gradually shoaling to the depth of 3 fathoms (5.5 m.) toward the shore, which is bordered by a bank of sand.

The bay is open from west-southwest to south, but the winds from that quarter are not dangerous. The northeasterly winds, although as frequent and violent as those in Novorossisk Bay, are less feared, as the entrance is open and vessels anchored in the middle of the bay can slip and stand out to sea if advisable. It may here be noticed that the wind blows with more violence in front of the ravines between the spurs of the Varada Mountain ridge, than at their projecting points. Vessels intending to remain any time at anchor should moor with their large anchor to northeastward. There is good anchorage for those of light draft abreast the landing place in 12 or 13 feet (3.7 or 4 m.) water.

**Shoals.**—Patches of 2¼ and 3¼ fathoms (4.1 and 5.9 m.) lie at 600 and 800 yards, respectively, westward of Tolsti Point, between which and the point there is a depth of 4½ fathoms (8.2 m.). A patch with 1½ fathoms (2.7 m.) lies about 600 yards southward from the point. Patches of 2 and 1½ fathoms (3.7 and 2.7 m.) lie from 200 to 300 yards offshore at 1,400 to 1,800 yards southeast of the point. The northwestern side of the entrance is fringed by a flat extending from 200 to 400 yards.

**Wreck.**—A wreck lies in the entrance to Gelenzhikskaya Bay.

**Landmarks.**—In order to distinguish the entrance to the bay the letter Г has been painted in black on the white cliff at a distance of about 100 yards southeastward from the light structure on Tolsti Point.

On the northern side of the bay are the cement works, the three chimnies of which are conspicuous.

**Tolsti Point Light,** alternating white and green, 63 feet (19.2 m.) above the sea, is shown from a white iron hut on truss, 19 feet (5.8 m.) in height, situated on the southeast point of the entrance to the bay.

**Gelenzhik Light,** fixed red, 52 feet (15.8) above the sea, is shown from a two-story stone dwelling with square tower, 41 feet (12.5 m.) in height, situated on the northeastern shore of the bay. (See Light List.)

A light is shown from a pier situated on the eastern side of the bank.

**Beacon.**—A pyramidal stone beacon 28 feet (8.5 m.) in height and elevated 150 feet (45.7 m.) above the sea stands on the hillside 1,500 yards 49° from Gelenzhik Lighthouse.

This beacon in range with the lighthouse, bearing 49°, leads into the bay.

**Buoys.**—A red spar buoy with inverted cone top mark is moored in a depth of 3½ fathoms (6.4 m.) off the foul ground extending from the northeastern extremity of the western entrance point of the bay.

A red cask buoy, the property of the Russian Steam Navigation Co., is moored off the town in a depth of 20 feet (6.1 m.). A red light is shown from this buoy when the vessels of that company are expected.

**Anchorage.**—Vessels anchor off the town in a depth of about 5½ fathoms (10.1 m.). Strong winds from seaward send in a heavy sea. Northeasterly gales occur here in the autumn, but are not as strong as those at Novorossisk.

**GELENZHIK.**—The town, which contains about 5,000 people, is much frequented by visitors in the summer as a resort.

**Pier.**—There is a pier at the cement works, on the northern shore of the bay, which is 1,120 feet in length and has a depth of 20 feet (6.1 m.) at its outer end. It is equipped with a steam crane.

There is another pier about 200 yards southward of the light in the bay.

**Supplies.**—Provisions can be obtained and are reasonable in price.

**Trade.**—The principal industries are cement manufacture, tobacco growing, forestry, vine culture, wine making, and fishing.

**Communication.**—There is regular steam communication with Odessa, Batum, and other Black Sea ports, and telegraphic communication with all parts. A good road connects the town with Novorossisk.

**Coast—Mezib.**—The valley of Mezib lies about 5 miles southeastward of Gelenzhik, at the extremity of the white cliffs. Shelter may be found in the roadstead during offshore winds in about 5½ fathoms (10.1 m.).

A conspicuous white house is situated on the coast about ½ mile northwestward of Mezib Valley.

Another white cliff will be seen at Khopitsai, about 2 miles beyond, eastward of which is the valley of Dzhankot between two bold reddish cliffs, and then a projecting point named "Cape Idokopas."

As a general rule the Caucasian coast is bold to approach, with the exception of a few points, which will be hereafter noticed, the average depths being 6 fathoms (11 m.) at 600 yards and 10 to 12 fathoms (18.3 to 21.9 m.) at ½ mile from the shore.

**Cape Idokopas** (*44° 25′ N., 38° 13′ E.*) is one of the most projecting points of the coast. Its summit is flat and covered with pine trees, some of which hang over the red cliffs. The cape can be recognized by a conspicuous diamond-shaped clearing in the woods above it. It is bordered by a reef and should be given a berth ¼ mile.

Mount Tkhachegochuk or Idokopas, 2,492 feet (759.6 m.) in height, lies 6½ miles northeastward from Cape Idokopas. It is conical in shape and conspicuous from seaward.

**Pshad anchorage.**—Eastward of Cape Idokopas the coast, composed of rounded cliffs, trends 9 miles east-southeastward to Chugovkopas Point. Between the eastern of these cliffs and the point lies Pshad Valley, bounded on the west by a round hill and on the east by a summit with a gray cliff. A small river runs into the sea here. On the shore are two white buildings with red roofs, belonging to the coast guard.

The anchorage is abreast the valley, which is fronted by a beach, but it is exposed from southeast round by south to west. A depth of 4 to 5 fathoms (7.3 to 9.1 m.), over mud and sand, will be found 300 yards from the shore. Care must be taken to avoid some sunken rocks which lie about 150 yards from the shore, off the mouth of a rivulet backed by a mountain which bounds the valley to the northward, and also off a small point on the southern shore.

In approaching this anchorage from the southward Chugovkopas Point (which is of moderate height and flat surface, with cliffs of a deeper tint than those of Idokopas and with a high conical isolated mountain near it) will be first recognized; then Cape Idokopas and the bold circular cliffs, and in the interior a round summit and a peak, while nearer the coast a bare cone tops the other mountains.

**Beta and Vulan Bays.**—From Chugovkopas Point the coast turns 1 mile northeastward to Beta Bay, which affords a good anchorage sheltered from westerly winds, but open to the southward. From thence it recedes to the northward and trends again to the eastward to Vulan Valley, 6 miles from the point, off which another anchorage presents itself, but is more open to westerly winds. Fort Mikhailov lies on the western side of the anchorage.

The village of Vulan is situated in the valley about 1 mile from the shore.

**Dzhubg anchorage.**—About 8 miles eastward from Vulan is the anchorage of Dzhubg, which is formed between the two headlands. This part of the coast is composed of white circular cliffs. The last of them, the headland eastward of Dzhubg, is bordered by a rocky flat with outlying rocks, and must be given a berth of 400 yards.

Vessels usually anchor abreast of the middle of the bay at ¾ mile from the shore, in a depth of 11 fathoms (20.1 m.).

The depths shown on the plan (1923) should not be relied on.

**Rock.**—A rock with less than 6 feet (1.8 m.) of water lies 300 yards, 200°, from Dzhubg Light.

**Buoys.**—A spar buoy with inverted cone marks the southern extremity of a shoal extending from the shore near the position of the lighthouse. A spar buoy with two cones, bases together, marks the western side of the same shoal.

**Dzhubg Light** (*44° 19′ N., 38° 43′ E.*), alternating red and green, 37 feet (11.3 m.) above the sea, red light visible 6 miles, green light 3 miles, is shown from a white hut on pillars, 14 feet (4.3 m.) in height, situated at Dzhubg.

**A fog signal** is made on a bell.

**Buoy.**—A mooring buoy from which a red light is exhibited when the arrival is expected of the steam vessels of the Russian Steam Navigation Co., is situated in a depth of 5 fathoms (9.1 m.) at about 600 yards southward of Dzhubg Lighthouse.

**Communication.**—There is regular communication by steamer with Odessa, Batum, and other Black Sea ports.

**Rocks.**—Two rocks are situated about 1 mile southeastward of Dzhubg anchorage; the outer rock has a depth of 17 feet (5.2 m.), and the inner rock, with a depth of 19 feet (5.8 m.), is situated 150 yards eastward of it.

There are depths of from 5 to 6 fathoms (9.1 to 11 m.) around these rocks.

**Buoy.**—A red spar buoy surmounted by an inverted cone is moored close southward of the outer rock.

**Shapsukho (Tengin) Bay** lies about 2½ miles eastward of Dzhubg, fronting a long valley which may be easily distinguished at a distance by a high mountain backing it to the northward. The valley is watered by a rivulet which reaches the sea through low ground, having a considerable beach in front. Rocky reefs extend for nearly 500 yards from both points of the bay. In this bay, as in almost all the roadsteads on this coast, a vessel should anchor some distance from the shore, in order to be able to clear it in case heavy weather should come on from seaward. Although this seldom happens, yet it will not be prudent to anchor in less than 5 or 6 fathoms (9.1 to 11 m.) about 600 or 800 yards from the beach. It invariably occurs, along the coast, that immediately the sea gets up the surf is very strong along the beach, and boats can not approach it.

**Buoy.**—A red spar buoy with inverted cone top mark is moored on the southern side of a 19-foot (5.8 m.) rock situated about 500 yards from the shore of the bay.

**Coast.**—From Tengin Bay the coast changes its aspect, the mountains receding farther from the shore, with their bold slopes wider apart, less regular in form, and much lower. The whole of the coast from Tengin Bay to Cape Agriya is fronted by rocks to a distance of 400 or 600 yards from the shore, and landing from a boat is impossible.

Guavga Point, 4 miles southeastward from Tengin Bay, is bluff and overgrown with trees. Eastward of this point, off the valley of the Nechepsukho River, is Mikhailovskaya Bay, which affords anchorage to small vessels in 3 to 4 fathoms (5.5 to 7.3 m.) at 600 to 800 yards from the shore. Reefs extend into the bay from both entrance points.

**Cape Agriya (Tu Point).**—Cape Agriya is situated 10 miles southeastward of Dzhubg and is somewhat prominent; it may be easily recognized by Mount Tu, 819 feet (249.6 m.) high, of conical form, rising from its center.

**Olginskaya (Tu) Cove** is about ¾ mile in diameter and situated at the entrance of a valley. Vessels may anchor here in 5 to 6 fathoms (9.1 or 11 m.) between two cliffs which mark the entrance and which are bordered by sunken rocks extending 200 yards from the shore. The depths within the cove are very uneven and the bottom is sand, rock, and shingle.

**TUAPSE BAY.—Cape Kadosh** (*44° 06′ N., 39° 02′ E.*).—The coast from Cape Agriya trends to the eastward, and then bends southward to Cape Kadosh or Chardak Point, situated 9 miles southeast of Cape Agriya, and which is immediately followed to the eastward by Tuapse Bay. This bay will be recognized by the lighthouse on Cape Kadosh, a steep cliffy point, as well as by the village of Velyaminovskaya, standing on table-land about 2 miles eastward of it.

The roadstead is open to southeasterly and southwesterly winds, but protected from the northwest by Cape Kadosh. Anchorage in 6 fathoms (11 m.) will be found 1 mile from the shore, and in 10 fathoms (18.3 m.) at about 5 miles.

**Cape Kadosh Light,** fixed and flashing white, 203 feet (61.9 m.) above the sea, visible 20 miles, is shown from a white octagonal stone tower 43 feet (13.1 m.) in height, situated on Cape Kadosh.

**Breakwater lights.**—Two vertical fixed red lights, at heights of 32 and 37 feet (9.8 and 11.3 m.) above the sea, are shown from a white iron post 22 feet (6.7 m.) in height, situated on the outer end of the east mole.

**Range lights.**—The front light, fixed red, 127 feet (38.7 m.) above the sea, is shown from a framework structure, 26 feet (7.9 m.) in height, situated 460 yards westward of Tuapse Church.

The rear light, fixed green, 147 feet (44.8 m.) above the sea, is shown from a framework structure 13 feet (4 m.) in height, situated 58 yards 353° from the front light.

These lights in range, 353°, lead into the large south harbor.

**Occasional lights.**—A white light is shown in the town when steamers of the Russian Steam Navigation Co. are expected. A red light is substituted when landing is impracticable.

**Beacons.**—Two structures on the shore from which lights were formerly exhibited, when in range, bearing 32°, lead into the Government harbor. The front structure is a red hut 11 feet (3.4 m.) high, and the rear structure a white hut on pillars, 9 feet (2.7 m.) high.

**Port Tuapse.**—The Government port, 1 mile eastward from Cape Kadosh, is formed by two moles. The eastern mole extends from the shore in a southwesterly and westerly direction for about 860 yards. The western mole, situated ½ mile from the eastern mole, extends 400 yards in a south-southeasterly direction; its inner end is not connected with the shore. The passage between the moles is about 400 feet wide.

There is a depth of 24 feet (7.3 m.) in the port alongside the outer part of the eastern mole for a distance of 1,750 feet, and about 23 feet (7 m.) alongside the inner part of the same mole. The outer part of the port is dredged to a depth of 24 feet (7.3 m.). Additional quayage is under construction.

**New harbor.**—The new harbor is close southward of the Government harbor. The south mole, semicircular, 1,000 yards in length, provided with bollards, is wide enough for all trading purposes.

The breakwater, also provided with bollards, with its southern extremity at about 200 yards westward of the outer end of the mole, is being extended to the northwestward and when completed will be about ½ mile long. Two basins, 490 feet wide and 700 feet in length, are to be constructed within the harbor next the shore, separated by piers about 700 feet in length. Wharves are to be built at a little distance from the shore, the space between being filled in by débris from the harbor, so that vessels of 28 feet draft may come alongside them. The railroad is to be led onto one or more of the piers, and capacious storehouses will be erected for the traffic of the port.

During the work of extending the breakwater to the northwestward vessels are recommended to use the eastern passage into the harbor.

**Storm signals** are shown here. See page 33.

**TUAPSE.**—The town of Tuapse, which contains a church and several schools, is situated eastward of the port; population about 5,600. It is the center for the administration of the district.

Two pipe lines from the Maikop petroleum fields have their outlets at Tuapse.

A considerable amount of fuel oil is shipped.

**Supplies.**—Provisions can be obtained.

**Communication.**—There is steamer communication with Odessa, Batum, and other Black Sea ports. There is telegraphic communication with all parts.

Tuapse is connected by rail with Maikop and Armavir.

A line along the coast to the southward, to connect with Kvaloni on the Poti-Tiflis Railway, is under construction.

The railroad coming from the northwestward passes through Maikop and has connections with Rostov, Vladikavkaz, Petrovsk, and Baku. The line along the coast to the southward has been completed for a distance of about 13 miles (1920).

**Coast.**—From Tuapse Bay the coast trends southeastward in almost a direct line for 34 miles to Zhoobzhe Point (*43° 40′ N., 39° 37′ E.*), which causes a difficulty in recognizing the different localities along its shore. The lofty summits of the mountains on the coast would serve as landmarks if they were not so often enveloped in fog or clouds. The most southern, as well as the most remarkable from its singularity of form, is Mount Shugus (Nugaigus), 10,640 feet (3,243 m.) high, situated 27 miles east-northeastward of Zhoobzhe Point.

**Psezuape Road.**—The valley of Psezuape may, however, be recognized by the fort of Lazarevskaya, situated on the site of the old fort on the bank of a rivulet of that name. Boz Tepe, a hill situated about 4 miles inland on the northern side of the Psezuape Valley, is conspicuous, and from the northwest or southeast appears as two peaks. From the roadstead it appears as a conical peak.

The roadstead is exposed to all sea winds from northwest through north to southeast.

**Subeshikh Bay** lies nearly 9 miles southeastward from Psezuape and may almost be mistaken for it, as the aspect of the beach is the same and the small fort of Golovinski (Shakhe), which stands here, has very much the appearance of the preceding one. This anchorage is also much exposed. A rivulet flows into the sea here.

**Sochi Bitkh (Sochi) Point.**—From Zhoobzhe Point, Sochi Bitkh Point, which is of medium height and rounded, lies southeastward 8 miles. The space which separates them forms a large and verdant valley, intersected by hillocks and bordered by a beach. The Sochi Psta River finds its way to the sea a little to the northward of Sochi Bitkh Point. The Russian fort named Navaginskaya stands on an eminence on the shore between this river and the point, and is commanded by a stone tower which may be seen from a great distance.

The current is much felt here running to the northwestward during strong easterly winds.

**SOCHI ROAD.—Sochi Light** (*43° 35′ N., 39° 44′ E.*), fixed white, 120 feet (36.6 m.) above the sea, visible 17 miles, is shown from a white stone tower 43 feet (13.1 m.) in height, situated on Sochi Bitkh Point.

**Range lights.**—The front light, fixed red, 60 feet (18.3 m.) above the sea, visible 3 miles, is situated 1,120 yards 329° from Sochi Light.

The rear light, fixed green, 72 feet (21.9 m.) above the sea, visible 3 miles, is situated 195 feet 90° from the front light.

**Conspicuous objects.**—From seaward a stone church, with bell tower and two spires rendered conspicuous by golden dome-shaped tops with crosses, will be seen; also a number of houses built on the low left bank of the river and on the plateau. A large, conspicuous white building may be seen above the pier.

**Wrecks.**—There are several wrecks in Sochi Road, for which see chart.

**Anchorage.**—Sailing vessels anchor off the town in a depth of about 16 fathoms (29.3 m.), mud and sand. Steam vessels can anchor closer in.

**SOCHI.**—The valley through which the Sochi Psta River flows is bounded on the east by a plateau, on which stands the town of Sochi. Along the shore are a number of fine houses. Above the town are vineyards. The climate is mild and healthy, and the place is the best-known holiday resort on the Black Sea coast. There are hot sulphur springs and other medicinal springs in the neighborhood.

Sochi is the center for the administration of the district and possesses Government offices.

**Pier.**—A pier with a depth of 8 to 9 feet (2.4 to 2.7 m.) at its outer end is situated northward of the town.

**Supplies.**—Provisions may be obtained.

**Communication.**—There is steamer communication with Odessa, Batum, and other Black Sea ports. There is a telegraph station at Socha.

**Coast.**—From Sochi Bitkh Point to Mustakuba Point, 7 miles to the southeastward, the shore is low, abrupt, and wooded, and is backed by a mountain named Kukhup, 2,170 feet (661.4 m.) in height.

Many fine residences are situated along this coast.

**Khosta Road**, formerly known by the name of Kamisler, where a rivulet flows into the sea, is a little to the southeastward of Mustakuba Point. The low land commences here, covered with forests running down to within 20 yards of the beach and extending beyond Mezyumta. To the southeastward some lofty mountains are seen.

Small vessels can find shelter from northwest winds in the center of the roadstead in a depth of about 3½ fathoms (6.4 m.), over the fine sand. In calm weather boats can enter the river.

**MEZYUMTA ROAD.**—**Adler Point** lies 12 miles southeastward from Sochi Bitkh Point, and thence the coast trends 2 miles southeastward to Konstantinovski Point. The old fort of St. Dukha is a little northward of the mouth of the Mezyumta River, which enters the sea southward of Adler Point and village. A bank of shingle has been formed off the mouth of the river, extending 200 yards from the shore, where there is a depth of 5 fathoms (9.1 m.).

**Adler Point Light** (*43° 25½′ N., 39° 56′ E.*), alternating white, red, and green, 35 feet (10.7 m.) above the sea, visibilities 7, 6, and 3 miles, respectively, is shown from a white hut on pillars, 29 feet (8.8 m.) in height, situated on Adler Point. (Extinguished, 1921.)

The lighthouse is situated among trees and is not at first sight easy to identify.

**Range lights.**—Two pairs of range beacons have been erected to point out the anchorage for the Russian Steam Navigation Co.'s vessels.

The northern range lights, which are in range when bearing 0°, each consists of a fixed green light shown from a white post with red square top mark on the front and a diamond on the rear.

The southern range lights, which are in range when bearing 87°, each consists of a fixed red light shown from a white post, the rear beacon being surmounted by an inverted triangle painted red, and the front beacon by a triangle painted red.

The southern range lights in range lead up to the anchorage. The northern range lights in range indicate the limit eastward of which vessels should not pass.

**Anchorage.**—The best anchorage is in about 10 fathoms (18.3 m.) with St. Dukha Fort bearing about 46°, distant 500 yards from the shore. The bottom is very uneven and falls suddenly into deep water.

**ADLER.**—The town of Adler extends along the beach northward of the entrance to the Mezyumta. It is conspicuous from a distance, owing to a group of high, pyramidal poplars. The town has a population of about 2,500.

**Trade.**—The principal exports are tobacco, fresh and dried fruits, wool, and wood. The imports consist of general merchandise.

**Communication.**—There is regular steamer communication with Odessa, Batum, and other Black Sea ports.

**GAGRI ANCHORAGE.**—From Adler Point the coast trends east-southeastward for 15 miles to the foot of Mount Oschten. At its base is a beach of small extent near the entrance to a narrow ravine. On the slope of the hill on the south side of the ravine is a castle, and at the foot of it on the beach are the buildings of a sanitarium and Gagri Village. At 1 mile southeast of the fort is the mouth of the Gagripsh River.

**Conspicuous objects.**—The fort is invisible from seaward, but a large gray building resembling a castle is built inside the old walls of the fort. Other conspicuous objects are a long white bathing house 1 mile southeastward of the fort, and a white schoolhouse with spire situated near the shore 1,600 yards farther to the southeastward.

**Range lights.**—The front light, fixed red, 56 feet (17.1 m.) above the sea, visible 5 miles, is shown from a mast on Gagri Pier.

The middle light, fixed red, 168 feet (51.2 m.) above the sea, visible 7 miles, is shown from a white rectangular beacon on a chimney of the castle.

The rear light, fixed red, 217 feet (66.1 m.) above the sea, visible 7 miles, is shown from a white rectangular beacon on a wall of the castle.

These lights in range, 26°, lead to the anchorage off the sanitarium.

**Beacons.**—Two white beacons, 322 yards apart, are situated near Gagripsh River. The front beacon consists of a mast and the rear beacon is a triangular framework.

These beacons in range, bearing 108°, lead parallel to the shore in a depth of 5 to 6 fathoms (9.1 to 11 m.), to a position where small vessels anchor with their sterns made fast to the shore.

**Anchorage.**—Gagri Road is a fair summer anchorage. The holding ground is good and the southwest wind rarely blows home. Owing, however, to the depth of water, it is necessary to anchor close in. Vessels usually anchor abreast the first hill southward of the ravine in a depth of 20 fathoms (36.6 m.), with the castle bearing 0°. Here they are sheltered from the squalls which blow down the ravine.

**Storm signals** are shown at Gagri. See page 33.

**Signal station.**—A signal mast for communicating with the shipping stands near the pier.

**Life-saving station.**—A lifeboat and rocket apparatus is stationed here.

**GAGRI** (*43° 20′ N., 40° 15′ E.*).—The village has good roads, an electric light station, and a good water supply. It is visited as a health resort. There is a cable railway to the mountains.

**Piers.**—An iron pier 150 feet long extends from the shore eastward of the fort, with the front range light on its outer end.

A stone pier of the same length is situated on the northwestern side of the entrance to Zuzkvara River.

Both piers are out of repair (1920), but there is sufficient water for a large boat at the outer end of the stone pier.

Communication.—Steamship service as at Adler. See page 376.

There is a telegraph station.

**Coast.**—From the southern side of the gigantic rock of Gagri a low and wooded land trends for 4 miles southward to the Bzib River, the water off the entrance of which is often discolored for a distance of about 2 miles to seaward, especially after rains. From thence the coast runs 2½ miles southeastward to Pitsunda Point.

**Pitsunda Point** (*43° 09′ N., 40° 21′ E.*) has on it a small fort near which there is a church, and may be recognized by the lighthouse, which, with a low dwelling house attached, stands to the southward of a thick clump of tall pine trees. (In 1919 the lighthouse was reported to be partially hidden by these trees and could not be seen on bearings of more than 108°.) The dome of an ancient church may be seen from some positions through openings between the trees. See Appendix IX, view U.

**Pitsunda Road.**—Eastward of Pitsunda Point, which is safe to approach, is the bay of the same name. A long and wide beach, beginning at the point, extends 1½ miles to the northward, thence trending eastward, when several white cliffs reappear and extend in an easterly direction as far as Tolstoi (Abikhu) Point, 6 miles from Pitsunda Point.

**Pitsunda Point Light,** alternating fixed and group flashing white and red, 118 feet (36 m.) above the sea, visibilities 16 and 10 miles, respectively, is shown from a white circular iron tower 111 feet (33.5 m.) in height, situated on the outer extremity of Pitsunda Point. (See Light List.)

**Shoals.**—About ½ mile to the northwestward of Tolstoi Point rocks extend 500 yards from the shore, and southeastward of the point they extend nearly ½ mile. From a point situated about 1,800 yards southeastward of it rocks extend a distance of 1,600 yards to the southward.

**Anchorage.**—The anchorage in this roadstead is inconvenient, there being a depth of 20 to 25 fathoms (36.6 to 45.7 m.) a short distance from the coast in the western part and from 6 to 8 fathoms (11 to 14.6 m.) 30 yards distant. It is also exposed to all southerly winds. There is a better anchorage in 18 fathoms (32.9 m.), mud bottom, abreast the first small cliff from the westward at the head of the bay, which is divided into two portions by a narrow gully. Small vessels may anchor 200 or 300 yards from the shore in 6 or 7 fathoms (11 or 12.8 m.), but the mud is soft. This is a good anchorage for the vessels that load here with boxwood. It is said that the sea winds seldom blow home and that little inconvenience is felt from the swell rolling in from seaward.

**Pier.**—Near the coast guard station, which is situated on the eastern side of Pitsunda Point, is a pier fitted with a derrick.

**Bomorski Road** (*43° 08′ N., 04° 31′ E.*).—The low cliffs beginning in Pitsunda Road terminate a little to the eastward of Tolstoi Point. Thence the coast trends southward to Souksu Point, 5 miles, forming the roadstead of Bomborski. The greater part of this shore is backed by low wooded land, and at a distance by high mountains remarkable for their being divided in three deep gullies. From some positions may be seen on an elevation which commands the plain of Bombori a palace with an ancient church near it, and nearer the sea the dwelling houses of the old Fort Bombori and part of its suburbs. On the shore are the ruins of a church, a guardhouse, and of several other buildings.

**Anchorage.**—Vessels anchor at various distances from the shore off Bombori. There are depths of 10 to 12 fathoms (18.3 to 21.9 m.) at ¾ to 1 mile distant, sheltered from winds from between west-northwest round by north to southeast. When the surf is not heavy they anchor abreast the guardhouse. Here, as elsewhere on the Caucasian shore, the Anatolian coasting craft are hauled up on the beach.

From the northern shore of the road near Tolstoi Point rocks extend as mentioned above, to a distance of 1,600 yards.

**Souksu Point.**—A rocky flat extends 800 yards southward and nearly 1,600 yards westward of Souksu Point, and vessels therefore should give the point a wide berth in passing.

**Coast.**—From Souksu Point the coast becomes irregular and trends eastward for 14 miles. It then bends southeastward to Sukhumski Point, which is 19 miles from that of Souksu. Nearly midway between these points may be seen rising near the shore two conical hills covered with wood. On that to the eastward are the remains of some ancient walls and two towers, one of which crowns its summit. This locality, as also the river close to it, bears the name of Psereti (Psirtkha). About 14 miles to the north-northwestward of Psereti, between mountains covered with snow, may also be recognized a high vertical rock commanding a pass, named by the Turks Pilav Tepesi and by the Russians Tseferbeya Shapka, 5,817 feet (1,763 m.) in height.

Eastward of Psereti are the conspicuous buildings of Novo Athonski Monastery, near which is a pier 252 feet in length with a depth of 9 feet (2.7) at its outer end. Vessels anchor southward of the pier in a depth of 5½ fathoms (10.1 m.).

**GUDAUT ANCHORAGE** lies in the bend of the coast about 3 miles eastward of Souksu Point, but it is exposed to southerly winds and only used by coasters.

The shores of the bay are foul to a distance of ½ mile, and a rock with a depth of 15 feet (4.6 m.) over it is situated 1,800 yards 120° from Gudaut Lighthouse.

**Gudaut Light** (*43° 06′ N., 40° 39′ E.*), fixed red, 54 feet (16.5 m.) above the sea, visible 7 miles, is shown from a white hut on pillars, 19 feet (5.8 m.) in height, situated on the high ground at the western extremity of Gudaut village.

**Occasional lights.**—A fixed white light, 35 feet (10.7 m.) above the sea, is shown on each side of the pier at Novo Athonski Monastery, midway along its length. These lights are shown when vessels belonging to the Russian Steam Navigation Co. are due at that place.

**Beacon.**—A mast beacon with supports, 30 feet (9.1 m.) above the sea, situated 50 yards behind Gudaut Lighthouse, when in range with it, bearing 306°, leads clear of the 15-foot (4.6 m.) rock mentioned above and of a rocky shoal with 5 fathoms (9.1 m.) over it situated 1.2 miles southeastward from the lighthouse.

**GUDAUT.**—The town of Gudaut is situated on the shore of the bay on an eminence about 70 feet (21.3 m.) above the sea. The streets are well paved and lighted.

**Supplies.**—There is a hydrant in the town from which good water may be obtained. Provisions are only obtainable in small quantities.

**Trade.**—The principal industries of the place are tobacco growing, wine making, and fishing.

**Communication.**—Steamers of the Russian Steam Navigation Co. plying between Odessa and Batum call regularly at Gudaut, and there is a telegraph station.

**Hospital.**—There is a hospital in the town.

**Sukhumski Point** may be rounded close-to, as a depth of 30 fathoms (54.9 m.) will be found 200 yards from its southeastern side; but between the point and Sukhum, 2 miles eastward of it, on the edge of a gravel bank which borders the bight and extends 1,000 yards from the shore, there is only a depth of 5 fathoms (9.1 m.), with deep water close-to the southward of it.

**Sukhumski Point Light** (*42° 59′ N., 40° 59′ E.*), flashing white, 121 feet (36.9 m.) above the sea, visible 17 miles, is shown from a circular white iron tower 124 feet (37.8 m.) in height, situated on Sukhumski Point. (See Light List.)

**A fog signal** is made by a bell.

**SUKHUM BAY.**—From Sukhumski Point the coast trends east-northeastward for about 3 miles, and then again southward, forming Sukhum Bay. In approaching it from the westward a narrow, deep gorge may be seen, bordered by steep precipices, and among their distant summits, white with snow, there is one in the shape of a saddle. The lighthouse on Sukhumski Point and several barracks standing on an eminence at the foot of the mountains serve to point out its position. From the southward the village, situated on a plain backed by mountains, may be recognized from some distance.

**Conspicuous objects.**—There are two very conspicuous buildings close together on the side of a hill in the vicinity of Kelasur, the northern one red and the southern white, forming good landmarks when making Sukhum from the southward.

**Range lights.**—The front light, fixed red, 38 feet (11.6 m.) above high water, visible 7 miles, is shown from a white iron beacon with ball top mark, 30 feet (9.1 m.) in height, situated on the southeast extremity of the facade of the fort.

The rear light, fixed red, 61 feet (18.6 m.) above the sea, visible 8 miles, is shown from a white iron beacon with ball top mark, 91 feet (27.7 m.) in height, situated on the northwest extremity of the fort 100 yards 285° from the front light.

These lights in range indicate the southern limit of the anchorage. (See Light List.)

These beacons, situated among trees, are not easily distinguished until they are nearly in range.

**Bridge lights.**—Six lights are shown on the bridge over Kelasur River at 2½ miles southeastward of the town.

**A fog signal** is made on a bell near the front light beacon.

**Anchorage.**—The anchorage, which is indifferent, from the steepness of the bank and liability to be blown off, is in about 6 or 8 fathoms (11 or 14.6 m.) 200 to 300 yards southward of the customhouse and eastward of the fort, as the depths do not increase so rapidly in this direction; but southward of the fort it shelves off suddenly to 60 fathoms (109.7 m.) ¼ mile from the shore. Vessels moor with one anchor to the southwest and the other toward the mouth of Besletka rivulet, which flows into the sea near the quarantine establishment. The bay is open to southwesterly winds, which are seldom dangerous but send in a heavy swell. The land winds are sometimes troublesome.

Sailing vessels entering or leaving the bay should give a good berth to Sukhum Point, to avoid being set upon it by the prevailing northwesterly current.

**SUKHUM**, built on the site of the ancient city of Dioscurias, is small, having a population of about 2,000, and has a pleasing aspect, owing to the luxuriant vegetation which surrounds it; but the climate is unhealthful at certain seasons of the year, and with a view to its improvement numbers of the blue gum tree (*Eucalyptus globulus*) have been planted.

**Piers.**—An iron pier extends from the shore southward of the town, and a small wooden pier is situated about 200 yards southwestward of the iron pier.

**Communication.**—There is regular communication with Odessa, Batum, and other Black Sea ports by the vessels of the Russian Steam Navigation Co. and by telegraph with all parts.

A main road, suitable for motor traffic, runs along the coast to Novorossisk.

**Kelasur Valley.**—About 2½ miles southeastward of Sukhum lies the Kelasur Valley, through which a rapid stream runs. A number of villas stand on the intervening coast, which gives Sukhum from seaward the aspect of a considerable town. A bazaar, backed by a hill on which stands the remains of an ancient fortress, draws a number of coasters here for the purpose of petty trade.

**Kodor Point** (*42° 51′ N., 41° 07′ E.*).—From Kelasur the coast trends southward 7½ miles to Kodor Point, which has given its name to the river flowing into the sea close southward of it. Care must be taken to avoid a bank which extends ⅔ mile northwestward from the point.

**Caution.**—The coast line between Kodor Point and Batum, a distance of about 80 miles, is said to be incorrectly shown on the chart, especially as regards longitude. It has apparently not been rectified, and as but few soundings are shown off it, it should be approached with caution.

**Current.**—After fresh westerly winds the current off the southern part of the Caucasian coast, between Poti and Batum, has been found to have a strong set toward the shore.

**Coast.**—From Kodor Point the coast trends 4 miles southeastward to Iskuriya Point, which is low and wooded. It then bends eastward for 9 miles to the mouth of the Tamush River, and from thence takes a southerly direction for 55 miles to Fort St. Nikolaya.

The whole of the country, commencing several miles northward of Kodor Point, to beyond Fort St. Nikolaya is an immense low plain, varied by some slight elevations covered with trees. It is bounded northward by the mountains of the Caucasus, the tops of which are always covered with snow, and to the southward by some of the mountains of Anatolia.

**Reef.**—A rocky reef fronts the shore from Baglan Point, situated 1 mile westward of Iskuriya Point, to Tamush Point, situated 6 miles eastward of it. At Iskuriya Point the reef is only 200 yards wide, but 5 miles farther eastward it extends more than ½ mile from the shore. This reef is not shown on the charts, the coast line being shown as a pecked line.

**Pier.**—A timber store with pier is situated 2½ miles eastward of Iskuriya Point.

**Ochemchiri anchorage.**—All the anchorages along this coast are exposed to winds from southward and westward, but several of them are frequented by coasters.

Ochemchiri anchorage, lying about 13 miles southeastward of Iskuriya Point, has good holding ground at 1½ miles from the shore. This anchorage is dangerous during the winter months.

**Ochemchiri Light**, alternating white and green, 37 feet (11.3 m.) above the sea, visibilities 6 and 3 miles, respectively, is shown from a white hut on framework, 29 feet (8.8 m.) in height, situated near the middle of the village of Ochemchiri.

**Ochemchiri.**—There is a telegraph station and a customhouse post at Ochemchiri. No supplies are obtainable.

**Anakriya anchorage** is abreast Fort Anakria, which stands about 20 miles southward of Ochemchiri, where the coast projects a little to the westward and where the Ingur River empties into the sea. The anchorage is on a bank 1½ miles from the shore in a depth of 7 to 10 fathoms (12.8 to 18.3 m.), with the fort bearing 68°. This bank falls abruptly into depths of over 50 fathoms (91.4 m.). There is a depth of 3 to 4 feet (0.9 to 1.2 m.) on the bar of the Ingur. The current in the river is very strong. A steam sawmill with iron chimney stands on the south bank of the river near its mouth. Some supplies can be obtained at Anakriya. Mount Olen lies about 12 miles from the shore.

**Redut Kale.**—This town and fortress stand at the mouth of the Khopi River, 6½ miles southward of Anakriya, the coast between being fronted at a distance of 200 yards by a sandy shoal within which is a depth of 9 feet (2.7 m.). Since the development of Poti the place has lost its importance.

A clump of tall trees at the entrance to Khopi River helps to identify Redut Kale.

The fort flagstaff bearing 97° leads to the best anchorage, in 7 fathoms (12.8 m.), mud bottom, at 1¼ miles from the fort. At this anchorage with light winds vessels will ride to the current, which runs to the northward. After severe storms it sweeps along quantities of wood which float down into the sea from the rivers on the coast.

**Khopi River.**—A bar of sand and stones, which is liable to shift, has formed at the entrance to this river, so that flat-bottomed boats or craft drawing less than 5 feet are alone able to pass it; inside the depths increase from 3 to 6 fathoms (5.5 to 11 m.). In rough weather, the waves being then opposed to the current of the river, which at times runs at a rate of 5 or 6 knots, causes a kind of rapid, which makes it impossible for any craft to cross the bar. This is felt as a great inconvenience, as the surf on the beach prevents goods from being landed outside.

**POTI HARBOR** (*42° 09′ N., 41° 38′ E.*) is situated about 8 miles southward of Khopi River.

**Conspicuous objects.**—The coast around Poti is very low, and the first objects sighted when coming from the westward are the lighthouse and a few straggling trees; the elevator in the harbor is the next object to become visible.

**Poti Light,** alternating flashing red and white, 118 feet (36 m.) above the sea, is shown from a circular white iron tower with lantern surmounted by a ball, 124 feet (37.8 m.) in height, situated on the northern side of the southern mouth of the Rion.

**Outer range lights.**—The front light, fixed red, 27 feet (8.2 m.) above the sea, is shown from a lamp-post, 22 feet (6.7 m.) in height, situated north of the harbor.

The rear light, fixed red, 35 feet (10.7 m.) above the sea, is shown from a lamp-post, 29 feet (8.8 m.) in height, situated 150 yards 114° from the front light.

These lights in range lead nearly 200 yards northward of the head of the south mole to the line of the range lights to the harbor entrance.

**Bolshoi Island Range Lights.**—The front light, fixed green, 21 feet (6.4 m.) above the sea, is shown from a square iron tower on the northwestern point of Bolshoi Island.

The rear light, fixed green, 33 feet (10.1 m.) above the sea, is shown from a square iron tower situated 233 yards 161° from the front light.

These lights in range lead into the harbor between the northern portion of south mole and the head of north mole.

**Harbor lights.**—A flashing white light with green sector, 37 feet (11.3 m.) above the sea, visibilities 9 and 5 miles, respectively, is shown from a white lantern on trusses, situated at the head of south mole.

A fixed white light, 23 feet (7 m.) above the sea, visible 9 miles, is shown from a white iron framework structure on the elbow of south mole.

Two vertical fixed blue lights are shown from a concrete pillar on the head of north mole.

**Anchorage.**—The anchorage in Poti Road is with the southern mouth of the river bearing 65°, about 2 miles from the shore in 10 or 12 fathoms (18.3 or 21.9 m.), muddy bottom, but the soundings are irregular.

**The harbor,** consisting of an outer and inner basin, is situated on the right bank of the northern entrance to the Rion and is formed by two concrete moles.

The south mole or breakwater extends from the north bank of the river in a westerly direction for 600 yards, and thence in a northerly direction for about 1,200 yards. The north mole commences at about 500 yards northward of the inner part of the south mole and extends to within a distance of about 560 feet of the northern bend in the south mole, with the entrance to the harbor between them. Between the inner ends of these moles is middle mole, dividing the port into two harbors, the Northern and Southern, with the inner basin eastward of the former.

The north mole, middle mole, and inner basin are connected with the Poti-Tiflis Railway.

The harbor is connected with the town by a narrow road which skirts the Rion as far as the railway station, whence it crosses to the southern bank by a substantial iron bridge. A wooden bridge also connects the harbor with the island, but communication thence across the principal arm of the Rion is restricted to boats.

A submarine cable has been laid across the entrance to the inner basin, marked by boards with "Кабель" on them.

Foreign ships are berthed at the north mole and on the northern side of the inner basin.

There is an elevator for loading manganese in the inner basin.

**Depths.**—The entrance to the harbor is 560 feet in width, but is narrowed by shoal water with a depth of less than 10 feet (3 m.) extending about 60 feet westward from the outer end of the north mole, and has a depth of 28 feet (8.5 m.). Within the harbor there is a depth of from 25 to 27 feet (7.6 to 8.2 m.), and also at the quays, but is liable to silt up. Dredging is continually in progress.

**Regulations.**—Entrance into the port of more than one vessel at a time is prohibited.

Vessels entering must give way to vessels leaving the port.

Agents of vessels arriving must notify the port office not less than 24 hours before the arrival of the vessel.

Foreign vessels must not enter the harbor without a pilot.

The pilot directs entering vessels from his boat.

Foreign vessels can only enter or leave between sunrise and sunset.

**Storm signals** are hoisted on the mast on the southwest angle of the south mole.

**Lifeboat.**—There is a lifeboat station and rocket apparatus established at the head of the north mole. A life boat is stationed near the lighthouse.

**Pilots.**—The pilotage into Poti Harbor is compulsory. Pilots will board vessels in the roads on the pilot flag being hoisted.

**POTI** is unhealthy, being built on the swampy delta of the Rion. The marshy forests throw off fogs which produce ague, especially in the months of July and August. The population is about 20,000.

The place is important as being the principal port for transshipment of cargo for and from Central Asia and the trans-Caspian district. It is also the principal port for the export of manganese ore from the Caucasus.

**Supplies.**—Only anthracite coal is obtainable. Moderate quantities of poultry, meat of poor quality, and vegetables in season can be obtained. The drinking water should be boiled before using. Small repairs to hull and machinery can be effected.

**Trade.**—The exports consist chiefly of manganese ore, maize, and cabinet woods, box, walnut, and ash. The imports are inconsiderable.

**Communication.**—There is regular communication with Odessa, Batum, and other Black Sea ports by the vessels of the Russian Steam Navigation Co., and telegraphic communication with all parts. Poti is connected by rail with Batum and through Tiflis with Baku, and also with the general railroad system of Russia.

**Hospital.**—There is a hospital in the town, but seamen are admitted only in very urgent cases.

**Quarantine.**—Pratique is granted, and customs formalities carried out after vessels are brought into the harbor.

**Rion River** is navigable by small steamers to Orpiri, a distance of 60 miles. About 2 miles from its mouth the river bifurcates, the larger and more important channel continuing to the southward; the other, turning slightly north, forms with the main stream a triangular island known as Bolshoi Island, which is now built over and forms a suburb of Poti, as before mentioned.

**Depths.**—This river has a bar of sand and stones at its mouth, which, being exposed to westerly gales, is constantly silting up, and the depth and direction of the channel are subject to frequent change. Under ordinary circumstances there is a depth of about 5 feet (1.5 m.) on the bar of the southern entrance, but inside the depths increase to 3 fathoms (5.5 m.).

**Buoy.**—A red spar buoy with inverted cone top mark, moored in a depth of 34 feet (10.4 m.), marks the extremity of a shoal extending in a northwesterly direction from the river entrance.

**Coast.**—**Fort St. Nikolaya** is situated 16 miles southward of Poti, at the mouths of the Natanel and Cholokh Rivers. There is good anchorage ½ mile offshore in 5 fathoms (9.1 m.), but it is as much exposed as those which precede it.

**Kobuleti.**—From Fort Nikolaya the coast still takes a southerly direction for 6½ miles to the village of Kobuleti, close southward of which is a conspicuous house, and where the extensive plains of Mingrelia and Gurda give place to the mountains of Anatolia. Here there is a station on the Batum Railway; thence the coast trends to the southwestward 11 miles to Batum.

**Tsikhinzir (Tsikhisdziri) Point,** 8½ miles southward of St. Nikolaya, is a low, rocky, and bluff point, and is noticeable by its light color, also by a conspicuous white house above it. From this point the railroad to Batum skirts the coast. Southward of this point, in the valley of the Chakvi Su, are large tea plantations. Two bright lights in this valley are visible from seaward.

**BATUM BAY** (*41° 39′ N., 41° 39′ E.*), which is about 1½ miles wide from east to west, is situated northward and seaward of an extensive plain covered with verdant trees and watered by several rivulets. It is backed by terraced mountains, over which the summits of others of still greater height are seen. Eastward of Burun Tabiya Point, the western point of the bay, is a very remarkable elevation near the shore, surrounded by the waters of the Karanischai River, which empties into the sea. Its form is that of a flat cone with steep sides, and a large building stands on its summit.

On Burun Tabiya, the low western point of the bay, formed by shingle brought down by the current of the Chorokh River, 5 miles to the southward, is a fort with arsenal and barracks, and a lighthouse. (Nearly hidden by trees, 1919.)

The Bartskhana River flows into the bay just eastward of the harbor.

**Conspicuous objects.**—When approaching Batum by far the most conspicuous object is the cathedral at the northern end of the town. It has a fig-shaped dome and a tower with a spire, very close together.

Other conspicuous objects are the Catholic Church with two spires, and the radio masts situated eastward of the town.

**Banks.**—A bank or flat with depths of 2 to 3 fathoms (3.7 to 5.5 m.) fronts the eastern shore from abreast Koronis River, gradually increasing its distance to 600 yards northward of the protecting mole. This bank extends 1,600 yards northward of the protecting mole within a depth of 5 fathoms (9.1 m.), the western edge sloping sharply into 10 fathoms (3 m.), and the deeper water, with depths of 20 to 60 fathoms (36.6 to 109.7 m.), in the space between it and Cape Burun Tabiya and the coast north and south of it.

Two obstructions lie, respectively, about 400 yards northward and 950 yards northeastward of the lighthouse on the petroleum mole.

**Wreck—Buoy.**—A wreck, marked by a spar buoy surmounted by two cones, bases together, lies about 600 yards northeastward of the light on the petroleum mole.

Westward of Burun Tabiya mole patches of 2 to 3 fathoms (3.7 to 5.5 m.) extends 300 yards offshore, with depths of 5 fathoms (9.1 m.) and more at ¼ mile off.

**Caution.**—The sunken net defense at the harbor entrance is raised clear of the bottom in places by buoys still attached to it, and is therefore liable to foul vessels crossing it (1919).

**Batum Light,** fixed white, 65 feet (19.8 m.) above the sea, visible 13 miles, is shown from a white octagonal stone tower with dwelling attached, 57 feet (17.4 m.) in height, situated northeast of Burun Tabiya Fort.

**Harbor lights.**—A fixed green light, with red and white sectors, 37 feet (11.3 m.) above the sea, visible 11 miles, is shown from a cylindrical white iron tower situated at the head of the petroleum mole in the petroleum harbor.

Two vertical fixed red lights, 21 feet (6.4 m.) above the sea, are shown from a post on movable platform, 10 feet (5 m.) in height, situated on Burun Tabiya mole. In case these lights can not be shown two vertical fixed green lights, 23 feet (7 m.) above the sea, visible 5 miles, are shown from a green post near the shore end of the mole.

**A fog signal** is made by a siren at Batum Light.

**Beacon.**—A white pyramidal stone beacon, 130 feet (39.6 m.) above the sea, stands on rising ground at the head of the bay.

**Buoys.**—Three spar buoys, each having one or two cones as a top mark, mark the northwestern edge of the bank on the eastern side of the harbor approach.

**Anchorage.**—The importance of Batum as an anchorage arises from the fact of its being immensely superior to any other on the eastern shore of the Black Sea, but its value is much lessened by the inconvenient depth for anchoring, which on the western side of the bay is upward of 20 fathoms (36.6 m.) at 100 yards from the shore, quickly deepening to 30 and 35 fathoms (54.9 to 64 m.), except southward of the Russian Steam Navigation Co.'s pier, where the depths are under 20 fathoms (36.6 m.).

Vessels anchor near the shore in front of the town in a depth of about 30 fathoms (54.9 m.), and secure their sterns to bollards on shore by means of hawsers. The space there is very limited, and it is necessary when anchoring to guard against fouling the anchors of other vessels. When waiting for a berth to become vacant vessels anchor on the edge of the bank northward of the petroleum harbor.

**Mooring buoys.**—There are mooring buoys in the bay, off the quays, and in the petroleum harbor.

**BATUM HARBOR.**—The port is situated on the western and southern sides of the bay.

The petroleum harbor is formed by a stone mole which extends from the south shore of the bay in a northerly direction for 470 yards, from whence the petroleum mole extends in a westerly direction for 550 yards. Another mole or breakwater extends from the head of the stone mole for a distance of 285 yards northeastward, protecting the Cabotage (coasting trade) harbor. The petroleum harbor is dredged to a depth of 27 feet (8.2 m.); the Cabotage has a depth of only 6 feet (1.8 m.), and is not now (1915) in use.

**Berthing regulations.**—On arrival at the port of Batum all steam and sailing vessels are to take up berths according to the indication of the port authorities, and no communication with the shore is allowed until all the customhouse and other necessary formalities have been completed.

All vessels, whether anchored in the roadstead or in the harbor, must have their anchors buoyed.

Vessels are allowed to make their moorings fast only to the permanent mooring posts and chains, and this without obstructing the landing places along the quays or the beach.

At the demand of the port authorities a master is bound to shift his moorings to neighboring mooring posts or chains, should necessity arise, when another ship is being berthed, or for any other reason that may be deemed necessary.

Vessels, whether lying off the beach or at the quay, which shall not have commenced to load or discharge within 24 hours after all the formalities required by law have been completed, or which have discontinued such operations for a period exceeding 24 hours, must move away from the berth they occupy if at such time there be any other vessel awaiting its turn in the roads. At the same time all holidays and days on which no work can be carried on are not taken into account.

Should notice be given that a vessel which is lying in the roads is not ready to receive cargo when her turn for berthing comes round, she can only again come on turn (as a fresh arrival) upon notice of her readiness to load being handed in.

Immediately on completion of their loading operations from the shore, vessels are bound to move away from their beach or quay berths into the roads, and there continue to perform any further operations, in case such berths at the beach or the quay are required for other vessels.

Ocean-going steamers under the Russian flag which enter the harbor for the purpose of taking in Government stores are allowed to load and discharge their cargoes out of turn should the captain of the port so ordain.

All vessels while lying in the roads are obliged to exhibit the prescribed regulation lights from sunset to sunrise. This rule applies equally to coasting vessels, barges, lighters, and rafts.

In cases of fire or other disasters whereby the safety of vessels or port property is endangered, all masters of vessels in the harbor, as also all boatmen and the railroad authorities, are bound at the first call of the captain of the port to place at his disposal all available means and locomotives for rendering assistance.

Vessels in the harbor are prohibited from changing berths without the permission of the port authorities.

Steamers proceeding to and from the quays in the petroleum harbor are forbidden to move the engines, except in cases of extreme necessity, when permission will have to be obtained from the port office.

After the completion of the prescribed customs formalities, all vessels leaving the port must produce their papers to the captain of the port for permission to proceed to sea.

**Winds.**—Batum Bay affords shelter from winds between northwest through south to east, and the only winds to be feared are gales from the northward, which are, however, very rare. Northeast gales are said to never blow home, and only on rare occasions do vessels moored with their sterns fast to the shore have to haul off. Gales from south-southwest to north-northwest send a heavy sea into the bay, causing vessels to roll and pitch at their moorings and often to part their hawsers and cables, when, if the harbor is full of shipping, they run great risk of collision with other craft. Vessels within the breakwater have frequently with southwesterly winds to haul off from the quay.

The prevailing winds and gales come from the westward, and especially from the southwestward. This latter wind sometimes blows in winter with the force of a hurricane. It is preceded by a fresh breeze from the southeastward, which rises after a calm and blows for several hours, accompanied by a sultry heat. The wind subsequently shifts suddenly to the southwestward and blows with great violence; the temperature falls and the barometer rises rapidly. Vessels anchored in the road or in the port should take all necessary precautions when the warm southeast wind sets in. Gales are most frequent in December. See Meteorological table, Appendix III.

**Lifeboat.**—There is a life-saving station with lifeboat on Burun Tabiya, and a life-saving station with rocket apparatus on the eastern shore of the bay near Tamari Castle.

**Pilots.**—Pilotage is not compulsory, but vessels are always berthed by pilots at the piers and moles.

**Directions.**—In foggy weather it is recommended to approach Batum Bay from the southwestward, as the coast is high and abrupt and the lower part of the mountains can be seen when the summits are hidden. The muddy water discharged by the Chorokh River also affords a good mark for recognizing the position. A berth of 400 yards or more should be given to the coast westward of Burun Tabiya, the shoal extending off it.

Coming from the northward, on the contrary, the coast is flat and the fogs are low.

**BATUM** (*41° 39′ N., 41° 39′ E.*).—The town of Batum, which stands on the western side of the bay, is unhealthily situated, being surrounded by swamps which, although partly drained, are, from the rankness of the vegetation, the cause of fevers and agues, most prevalent between the months of June and October.

The town, which is lighted by electricity, has broad and regularly planned streets with rows of trees, and there are many large houses. On the shore is a long boulevard with a mass of foliage, and near the town are public gardens. There is a fine cathedral in the town, conspicuous from seaward; also several mosques. There are numerous piers, public and private, near which are storehouses and the customhouse. The health office is situated near Burun Tabiya. Eastward of the town, on the south shore of the bay, are the storehouses and factories connected with the petroleum industry.

The population of the town is about 30,000.

It is not safe to venture into the suburbs without an escort, on account of the numerous bands of marauders.

**Quays.**—There are a number of quays on the western shore fronting the town, to which vessels anchoring off haul in with stern fasts. There are mooring buoys off the shore.

The Russian Steam Navigation Co. has a small mole situated near the customhouse.

A mole 60 yards wide extends in a north-northeast direction from the northern extremity of Burun Tabiya.

The railroad extends onto the petroleum mole, with depths of 18 to 21 feet (5.5 to 6.4 m.) along the inner side; also pipe lines for conveying petroleum to vessels alongside. The petroleum is brought from Baku in a conduit tube which crosses the height of Suram between these places.

**Coal and supplies.**—About 7,000 tons of Russian coal is usually in stock, in addition to about 5,000 tons of Government coal. Vessels coal alongside a quay in the petroleum harbor, where there is a depth of 26 feet (7.9 m.). Petroleum waste is extensively used as fuel by the local steamers on the Black and Caspian Seas.

Fresh provisions were plentiful and cheap. Water is of good quality and is brought off in a tank boat.

**Repairs.**—Small repairs to vessels and machinery may be made. There is a floating crane capable of lifting 40 tons.

**Communication.**—Batum is the readiest point of internal communication with Georgia, Armenia, and Persia, and is a principal transit port. It is in railroad and telegraphic communication with Tiflis, Poti, and Baku, from which latter place enormous quantities of petroleum are sent to Batum for shipment; also there is telegraphic communication with Trebizond, and weekly with Odessa and other Black Sea ports by the Russian company's steamers.

There is a railroad to the military town (Voenni Gorodok), about 3 miles distant, where the barracks, arsenals, and magazines are situated, and from Tiflis a branch railroad runs to Kars and Ervian.

**Radio.**—There is a radio station at Batum, call letters RCF, range 600 miles, wave length 3,000 meters.

**Hospital.**—There is a town hospital.

**Quarantine.**—Vessels must remain in the road until pratique is granted.

**Gunie.**—The lowlands which are found near Batum extend for 6 miles to the southwest beyond the mouths of the Chorokh River, of which they are the alluvions, and from their marshy nature they render the west side of Batum Bay very unhealthy from July to October. On the most southern of these mouths stands the town of Gunieh, which carries on a coasting trade, and 2½ miles southward, near Scarpi, is a very conspicuous culvert near the coast. Southeastward of Gunie is a large valley, through which the Chorokh River flows. Beyond the lowlands the mountains gradually approach the shore and are of considerable elevation, with white cliffs appearing at intervals.

**Shoal.**—Vessels should give a good berth to the coast between Burnu Tabiya and the Chorokh River, as a shoal extends some distance from the shore.

# CHAPTER IX

## BLACK SEA

### ANATOLIAN OR SOUTHERN SHORE; BATUM TO THE BOSPORUS

**Anatolian coast.**—This coast is nearly devoid of ports or harbors, and those that exist are at a distance from each other and would offer no security to shipping were it not for the mountains neutralizing the effect of the sea winds, which do not blow home. From this circumstance several anchorages afford shelter from tempestuous weather, although they have not a tempting appearance. Too much reliance must not, however, be placed on this observation, as in certain localities the shelter of the hills is far from being so good as in others. The westerly winds are the most violent on this coast.

**Aspect.**—The most conspicuous objects are the hills Suiu Dagh (*40° 52′ N., 41° 05′ E.*), the summit of which rises above the coast ridge and is visible from a considerable distance in clear weather; the coastal hills, Mount Gunie of a conical form, 4,800 feet (1,463.0 m.) high, covered with snow during the greater part of the year, and the best landmark on that part of the coast, Tepe Fulo, Ioannis, 1,600 feet (487.7 m.), and Kalon Oros, 2,600 feet (792.5 m.), near Rize; also the hills near Trebizond.

Farther westward are Sis Dagh, Chal Dagh, Bash Kizdran, Nabien Dagh, Katran Dagh, within Samsun; and still farther westward a series of conical hills between Kerempeh Burnu and Amastra, with bright white patches along the coast; the Kirkgechid Dagh within Sinub, Mount Kipekchi within Cape Baba, Mount Kirpen within Kirpen Adasi, Kandra Dagh, Agvah, and Chatal Dagh, and Mal Tepesi, near the Bosporus.

**Harbors.**—Sinub (*42° 02′ N., 35° 10′ E.*) is the only safe anchorage in all weathers on this coast. Rize, Trebizond (with Platana, to the westward), Kerasunda, Ordue, Vona, Fatsa, Unie, Samsun, Ineboli, Amasra, and Bender Eregli afford calm-weather anchorage for small vessels.

Vona is well sheltered from northwesterly winds; the remaining ports are open to winds from northwest to northeast.

**Coast—Anchorages.**—From Batum Point the coast trends in a southwesterly direction for 43 miles to Kiz Kalessi. The anchorages of Makriali, 7 miles south-southwestward of Gunie and 11 miles from Batum; of Kise, 8 miles beyond Makriali; and of Sumla, 12 miles farther on, are all more or less exposed to westerly winds.

**Aspect.**—Between Kise and Trebizond, a distance of about 80 miles, the coast is backed by a continuous snow range, with many sharp peaks. Close westward of Kise is Perenit Point, high and steep, which may be distinguished by Tepe Fulo, a sharp, dark mountain 1,650 feet (502.9 m.) high; two white patches on the neighboring heights also mark it. At Abu Islam a waterfall may be seen.

**Telegraph.**—A telegraph line follows the coast. There are stations at Khopa and Arkhava, situated, respectively, 1 mile northeast and 5 miles southwest of Kise; also at Athina near Seidol.

**Kiz Kalessi** (*41° 12′ N., 40° 52′ E.*) lies to the westward of Athina and may easily be recognized by a bold rock on which are the ruins of an ancient castle. On the shore eastward of Kiz Kalessi are several buildings.

**Seidol Road.**—The roadstead of Seidol, about 3 miles eastward of Kiz Kalessi, is better than those given above and is much used by coasters. A hill to the eastward, known to the natives as Eski Tarabozun (Old Trebizond), with three perpendicular sides, appears as a table-land covered with trees. To the eastward of the hill the River Fortuna enters the sea.

**Coast.**—From Kiz Kalessi the coast trends southwestward for 6 miles to Kemer Point, and thence in the same direction 12 miles to Pirios Point. In this distance it recedes about 2 miles to the southward and is backed by very high mountains. The Askoros River empties into the sea 3 miles eastward of Pirios Point, and the coast between falls back 1 mile to the southward, forming the bay of Rize.

**Pirios Point** is surrounded by a reef which extends ¼ mile from the shore, and a rock awash lies 700 yards 290° from its extremity and about 300 yards from the shore. Between the point and the town of Rize there is a tower, and two others on the beach to the eastward. A hill, also near the beach, has an old tower on its summit.

**Pirios Point Light** (*41° 04′ N., 40° 31′ E.*), flashing white, 49 feet (14.9 m.) above the sea, visible 10 miles, is shown from a white metal pillar located on the northwestern extremity of Rize Bay.

**Landmarks.**—The best landmarks for Rize are Mt. Ioannis, 1,600 feet (487.7 m.), and Kalon Oros, 2,600 feet (792.5 m.). When closer in the town of Rize is seen, the most conspicuous buildings being the town hall, a white three-storied building, and the Russian vice consulate, situated on a hill and also white and of three stories. The slopes of the hill near the coast are covered with orange and lemon trees.

**Anchorage.**—There is a depth of 3 fathoms (5.5 m.) over a sandy bottom about 200 yards from the shore, and 5 fathoms (9.1 m.) at 600 yards. To the southeastward of Pirios Point the bottom is sand and shells, and no mud will be found till within ¾ mile of the shore northeastward of the town of Rize. The anchorage is exposed to winds from northward of northwest, which raise a heavy sea in the bay and prevent communication with the shore.

Gales are prevalent from December to February. Vessels then proceed to sea or else anchor in the eastern part of the bay. This anchorage is considered safe, and native sailing vessels winter there. Northerly winds raise a heavy sea and prevent communication with the shore.

The current from the Askoros River, which sets in a westerly direction, attains in summer a velocity of about ½ knot. In the winter in the eastern anchorage this current is strong enough to keep vessels at anchor with the wind from west or northwest from tightening their cables.

**RIZE** is situated on the southern shore of the bay and on the rising ground behind it. There are several outstanding buildings. Most of the houses are built of wood. The town, in contrast to others on this coast, is said to be very healthy and the vegetation is luxuriant. Population about 14,000.

**Supplies.**—Bread and meat can be obtained; vegetables are scarce. Water is abundant and good. It is brought to the town by pipes and put on board vessels in casks. The water from the Askoros River is equally good.

**Communication.**—The steamers of the Russian Steam Navigation and other companies call at Rize when the weather permits. The roads from the town to the interior are not practicable for vehicles; in winter snow prevents all communication. There are Turkish and Russian post offices; also a telegraph station. Messages for transmission must be in the Turkish language.

**Surmena Bay.**—Cape Fiji lies 6 miles westward of Pirios Point. and Cape Ereklia nearly 14 miles farther westward. The coast falls back about 3 miles between these capes, forming Surmena Bay, in which the water is also deep, but temporary anchorage may be found in the western portion of the bay. The locality, however, being extremely malarious, owing to adjacent marshes, is to be avoided during the summer season. Cape Ereklia, the western extremity of the bay, should be given a berth of ½ mile. There is a good landing in Surmena Bay in fine weather on a beach 1¼ miles in length, but exposed to northerly winds. There is a manganese mine near Surmena.

**Gavgos** (*40° 58′ N., 40° 03′ E.*), a fishing village situated 1½ miles westward of Cape Ereklia at the mouth of Yamboli River, has sheltered landing during offshore winds on a beach nearly ½ mile long.

**Kovata Bay.**—From Cape Ereklia the coast trends 3 miles westward to Falko Point; thence it again curves southward, forming a bay eastward of Kovata Point, which lies 7 miles westward of Falko Point. Kovata Point is rocky, and on its slopes are gardens and small houses. It should be given a berth of ½ mile. The roadstead of Kovata, which affords shelter from westerly winds, is abreast the Drono River, which empties into the sea 2 miles southeastward of Kovata Point. There is a sandy beach, suitable for landing in fine weather, at Yomura village, situated at the mouth of the Drono.

**TREBIZOND BAY—Aspect.**—From Kovata Point the coast trends westward for nearly 3 miles to Khopsi Point, between which and Kalmek Point, 2 miles to the westward, is Trebizond Bay.

The town of Trebizond is spread over three hills, which slope gradually toward the sea; these hills are divided by ravines connected by two large and several small bridges. Most of the town is visible from seaward; especially conspicuous is the Catholic school. Eastward of the town is a small suburb called Deghirmen or Dere Menderi (Valley of the Mills), where the Erzerum road turns to the south, and beyond it is one large and two small mills. A number of minarets rise above the town. There is a citadel or fort on Kalmek Point. The locality may be recognized from a distance by Boz Tepe, 800 feet (243.8 m.) high, rising behind it, on the side of which is a Dervish monastery, a large building surrounded by walls; the red building westward of the lighthouse is the Artillery Barracks. Farther westward beyond the town and very conspicuous, is the old monastery of Agia Sophia. See Appendix IX, view V.

**Kalmek Point,** the northwest extremity of the anchorage of Trebizond, affords protection from westerly winds. Rocks extend off it to the northward about 70 yards. A battery, a lighthouse, and other buildings stand on the point.

**Trebizond Light** (*41° 01′ N., 39° 46′ E.*), group flashing white, 90 feet (27.4 m.) above the sea, visible 12 miles, is shown from a white metal pillar 20 feet (6.1 m.) high, located on the edge of cliff at Kalmek Point.

**Wreck.**—A wreck lies about 700 yards 256° from Kalmek Point Light.

**Anchorage.**—The roadstead is eastward of Kalmek Point, and in strong westerly winds only affords fair anchorage to small craft under the shelter of Kalmek mole. Vessels load in the roadstead by means of lighters carrying from 25 to 30 tons.

The best anchorage is with Trebizond Lighthouse bearing about 290°, 700 yards distant, in about 5 fathoms (9.1 m.) with good holding ground of mud and sand, and just clear to the eastward of some high land, which causes the land wind on fine nights to come off in strong gusts. It is advisable to moor with open hawse to the northward, the anchors laid well apart, and a good hawser and stream anchor out astern. The wind is so variable here, coming off the land every night, that if a vessel swings she will be continually broadside to the swell and run the risk, from perpetual changes, of loosening her anchors in the ground, besides the difficulty of keeping a clear hawse. She may hang by her stern anchor without any fear, and at the commencement of a gale from the northwest the hawser can be veered to allow her to come head to wind. The breeze will soon be over, when it should be hove in again to keep the swell from the northward right ahead.

During very strong winds steam vessels often put to sea or shift berths farther offshore than the usual anchorage, and with both anchors down.

Small craft anchor in the bight close under Kalmek Point in 2 to 3 fathoms (3.7 to 5.5 m.), partly sheltered by the breakwater.

The head of the bay is fronted by a beach, and to the eastward of Eleusa Point there is another beach bordering the entrance of Deghirmen River, which a little above its mouth is spanned by a stone bridge with several arches.

**Landing** during a heavy swell caused by on-shore winds is very difficult. On these occasions a shore boat should be used, the crew of which run the boat up on the beach south of the customhouse. In fine weather the landing place is at the customhouse jetty, where there is sufficient water for boats to lie.

**Port.**—A quay about 350 feet in length in a north-northeast direction, with an arm of 70 feet to the eastward, is built at Kalmek Point and affords loading facilities and shelter to small craft. A mole (in state of collapse, 1926) 890 feet in length extends in a northerly direction from Eleusa Point, with an iron framework tower on its outer end, and has an arm extending to the eastward under construction. There is a depth of 30 feet (9.1 m.) alongside this arm. Two sunken steamers, end on, prolong the arm to a total length of about 1,200 feet, along the inner side of which large lighters can lie, and where there is a good landing for boats. A pier extends from the shore opposite the eastern end of the sunken steamers, thus forming a harbor with an entrance 600 feet in breadth.

It is proposed to extend Kalmek Point mole farther to the eastward.

**Winds.**—The prevailing winds at Trebizond are from the southward. Easterly winds, and in summer northerly and northwesterly winds, however, blow ordinarily during the day. Northwesterly winds are of short duration, but are sometimes very violent and raise a heavy sea in the bay.

The appearance of Cape Ieros gives a good indication of the probable weather. If the cape be free from clouds and clearly visible fine weather may be expected. If the cape be covered with clouds the weather will most likely become bad.

**TREBIZOND** has about 60,000 inhabitants. It is subject to malarial fever, caused by the marshes in the neighborhood. The Moslem population live chiefly in the old walled town, at the foot of which are the remains of an ancient port, and westward toward Agia Sophia; the foreign and business quarter is to the eastward.

Trebizond is the principal town of the vilayet of that name, which in spite of its small area is one of the most thickly populated districts in Turkey.

**Supplies.**—Fresh provisions are plentiful and moderate in price. Good water can be obtained from Piksit rivulet near the Deghirmen rivulet by boats furnished with hose; the water is muddy but wholesome.

**Trade.**—Besides being the port of Erzerum, it is one of the chief transit ports between Persia and Europe. Large numbers of anchovies and porpoises are caught, the latter producing oil. The exports consist of hazlenuts, beans, eggs, tobacco, hides, and sheep; also Persian carpets, shawls, and raisins. The imports are chiefly cotton and woolen stuffs, sugar, tea, coffee, metals, and hardware.

**Communication.**—There is frequent communication with Constantinople, Odessa, and Poti by vessels of the Russian Steam Navigation and other companies. In addition there are regular services of steamers to other Black Sea ports, and telegraphic communication with Erzerum; also with Constantinople, Batum, and all parts. There is a road to Erzerum, along which the whole Persian traffic is conducted. Inland postal communication twice a week.

**The climate** is in general good. Epidemic diseases are rare; illnesses are due to malarial fevers, mainly in the summer, and chiefly in the lower parts of the town. These are not dangerous to crews of vessels in the roads.

**Hospitals.**—There is a military hospital with 150 beds and a town hospital, free, with 30 beds.

**Platana anchorage.**—The anchorage is in a depth of 10 to 15 fathoms (18.3 to 27.4 m.), about ½ mile from the town, with the Greek Church and minaret in range. Vessels moor with open hawse toward the shore, as the land winds are violent. From the depth of 25 fathoms (45.7 m.), which will be found ¾ mile north-northeast of the town, the water shoals gradually to 5 fathoms (9.1 m.), over sand and mud, 300 yards from the shore.

The roadstead is often resorted to by vessels trading with Trebizond, it being sometimes possible to discharge cargo and land passengers when they can not do so at that place. It is also a good winter anchorage, secure against the sea winds, notwithstanding it is exposed from north-northwest to east.

**Platana** (*41° 02′ N., 39° 36′ E.*) is a town having a population of about 10,000, lying 7 miles to the westward of Trebizond. There is a beach of loose sand opposite the town nearly ½ mile long, at the eastern end of which are several warehouses.

**Sargana Point** lies 1¼ miles northwestward from the town and is bordered by rocks extending about 200 yards from the shore. The coast from there trends northwestward for 5 miles to Zeitun Point, which forms the eastern angle of the broad promontory of which Cape Ieros is the western.

**Cape Ieros**, 9½ miles westward of Platana, forms a useful landmark for vessels bound to Trebizond, as it projects to the northward, has several white patches in its vicinity, and a lighthouse near its extremity. It is one of the highest headlands in the Black Sea, and may be seen from a distance of 60 miles in clear weather.

Its shores are irregular, of a reddish tint, and a conical hill, well cultivated, rises at its extremity.

The winds near the cape are frequently from opposite points, while close in there will be a belt of calms.

**Cape Ieros Light** (*41° 07′ N., 39° 26′ E.*), flashing white, 98 feet (29.9 m.) above the sea, visible 8 miles, is shown from a white stone tower with a white one-story dwelling attached, located 120 yards within the extremity of Cape Ieros.

**Aspect of coast.**—Westward of Cape Ieros the coast hills are lower than to the eastward, and there is no continuous snow range. The distant hills or mountains recede farther from the coast. Especially conspicuous are the mountains Sis Dagh, 7,125 feet (2,171.7 m.) in height, and Chal Dagh, 6,450 feet (1,966.0 m.) in height, southwestward of Cape Ieros and southward of Kerasunda, respectively. The former has a varied appearance from different directions, but the latter appears cone-shaped.

**Zeitun Point—Anchorage.**—Westward of Cape Ieros the coast trends to the southwestward, and thence northwestward to Zeitun Point, distant 10½ miles from Cape Ieros, forming a bay, known as Buyuk Liman, in which there is good anchorage abreast of Cheshme rivulet, sheltered from west round by south to east by north.

Zeitun Point is wooded, with several buildings near it.

**Kureli and Kara Points.**—Kureli Point is a low projection of the coast, distant 2 miles westward of Zeitun Point; on its extremity are some ruins. Kara Point is also low and lies 10 miles westward of Kureli Point; a dark hill with a conical summit lies within it. Between Kara Point and Tereboli the coast hills are lower, and between them may be seen a ravine through which flows the Karshut Su. Eastward of its mouth are some houses, with a sandy beach beyond.

**Tereboli Light** (*41° 01′ N., 38° 50′ E.*), fixed red, 79 feet (24.1 m.) above the sea, visible 5 miles, is shown from a white column located on the extremity of Kurdzhia Kale, the easternmost of three points.

**Tereboli** (*41° 01′ N., 38° 49′ E.*).—This town stands on three small points which form two coves at 5½ miles westward from Kara Point. It has a population of about 8,000. The western cove is encumbered with rocks, but the other carries a depth of 3 fathoms (5.5 m.) and will contain five or six coasters with warps to the western shore; it is, however, exposed to northerly winds. A rocky reef extends between 1,000 and 1,200 yards northward from the western point of the cove.

The best anchorage is in the roadstead northeastward of the town, abreast Karshut Su Beach, in from 6 to 8 fathoms (11 to 14.6 m.), hard sand.

Sis Dagh in fine weather easily identifies the locality; when it is covered by haze or fog the lighthouse should be a good mark. The buildings and minarets are conspicuous from the offing.

**Furun Islets.**—Two rocky islets, named Furun, lie abreast a projection of the coast 2 miles west-southwestward of Tereboli.

A shoal with a depth of 5 feet (1.5 m.) over it is reported to lie 200 yards northward of the western islet.

**Zephyr Bay.**—Cape Zephyros, a high point, lies 6 miles westward from Furun Islets, and between them the coast falls back 2 miles to the southward, forming Zephyr Bay. Its western shore is steep and rocky, with grayish cliffs, while the southern and eastern shores are sandy. At the head of the bay there are small villages.

Zephyros village stands on its western shore, and the anchorage for small craft is abreast of it in from 5 to 10 fathoms (9.1 to 18.3 m.), over sand and mud, at 100 yards offshore, and sheltered from northwesterly winds round by south to east-northeast. Toward the cape the shore is bordered by a rocky ledge, which generally breaks.

**Coast.**—The coast hills westward of Cape Zephyros to Kerasunda are rugged in appearance as far as Kashab rivulet, where a large white building may be seen; further on toward Pugachak hillock, which is conical, is a low beach.

Pugachak Bight is somewhat sheltered by Puga Islet, on which are the remains of an old fort. It affords anchorage for coasters in 10 to 12 fathoms (18.3 to 21.9 m.) not far from the shore, sheltered from west and northwest winds.

Sailing craft sometimes anchor between the islet and the shore, but the protection is very slight.

**Kerasunda approach—Conspicuous objects.**—Kerasunda is situated 10 miles westward of Cape Zephyros, on both sides of a promontory 425 feet (121.9 m.) high, projecting to the northward from the foot of the mountains.

On the summit of the promontory are towers, from which extend down the slopes the walls of the old fortress. The best part of the town has many churches and gardens.

A good mark for approaching in clear weather is Chal Dagh, which bears 197° from Kerasunda, and, nearer in, the light tower.

**Dangers.**—**Palamida Rock,** 2½ feet, (0.8 m.) high, is about 140 feet in extent east and west and lies ½ mile 29° from the northern extremity of the promontory.

**Kiortam Bank,** about 300 yards in extent, consisting of several rocky heads with a least depth of 5 feet (1.5 m.), lies 400 yards nearer the shore. Depths of 10 to 12 fathoms (18.3 to 21.9 m.) are in the channel between this bank and Palamida Rock, and from 5 to 7 fathoms (9.1 to 12.8 m.) between it and the shore. Vessels should give Palamida Rock a berth of at least 200 yards when passing it.

**Reef.**—From the point forming the northwestern extremity of the promontory of Kerasunda a reef, formed by the remains of an ancient mole, projects in a westerly direction for 350 yards. A Greek church, with spire, stands on this point.

**Kerasunda Light,** two fixed white lights, the uppermost being 194 feet (59.1 m.) above the sea, both visible 12 miles, are shown from a mast on a white house located on the northwestern part of the point.

**Anchorages.**—There are two anchorages at Kerasunda, neither of which is well sheltered from the prevailing winds. Vessels should select the anchorage according to the wind.

Coasters anchor in Demirkapi Bay, eastward of the promontory, at a little distance from the shore in 12 or 13 fathoms (21.9 or 23.8 m.) water, sheltered from west to northwest but exposed to northerly winds, at which time the surf is very heavy. There is better anchorage farther offshore in 16 fathoms (29.3 m.) where one anchor will be sufficient.

There is also anchorage in the bay close westward of Kerasunda Promontory, named Lonja, in 8 to 10 fathoms (14.6 to 18.3 m.) but it is exposed to westerly winds, and with all its faults that of Demirkapi is to be preferred. Lonja anchorage is, however, the one used by the steamers that call at Kerasunda, and the usual landing place and the customhouse are on this side of the promontory.

Vessels sometimes anchor in the roads to the westward of Lonja off the mouth of Batlama River, in depths of about 20 fathoms (36.6 m.).

**Kiresun (Kerasunda)** (*40° 56′ N., 38° 24′ E.*) has a population of about 18,000. The principal exports are nuts, corn, wax, hides, and butter. The principal imports are manufactured goods, iron, tobacco, and sugar. Fresh provisions are plentiful. Water is abundant and good.

**Cape St. Basili (Agios Basilios)** is fringed by rocks and lies 5 miles westward of Kerasunda Light.

**Shoal.**—Along the coast westward of Cape St. Basili is a shoal of 13 feet (4 m.) water, which in some parts extends more than 1 mile from the shore.

**Mount Tekmen** (*40° 56′ N., 38° 17′ E.*) is not high, but is conspicuous from all directions seaward owing to its dark color, and may easily be seen from a distance of 28 miles in ordinary weather, appearing as a cone from the northeastward.

**Coast—Ordu approach.**—The coast from Cape St. Basili forms an almost unbroken line for 20 miles in a west by north direction, with occasional beaches, as far as the town of Ordu, which may be recognized by its location on the eastern slope of Boz Tepesi. Boz Tepesi forms a promontory projecting to the northeastward between the beach of Melet and that of Pershemba.

**Anchorage.**—The roadstead of Ordu is good, with depths of from 6 to 9 fathoms (11 to 16.5 m.), over mud and sand, with Ordu Point situated midway between the town and Buzuk Kale, bearing between 338° and 326°. It is sheltered from westerly winds, but exposed to those from between north and east. The depth is about 4 fathoms (7.3 m.) at ½ mile offshore, with Vona Point just in sight open of Buzuk Kale. The southern part of the bay is shallow.

With northerly winds vessels should shift to Vona Bay, about 5 miles northwestward.

Buzuk Kale has a reef extending a short distance.

**Ordu** (*41° 00′ N., 37° 52′ E.*) has a population of 7,000. The chief exports are beans, nuts, wool, wax, and eggs. Manganese mines are working in the vicinity of the town, one being situated at Boz Tepesi. Steamers of several lines trading in the Black Sea touch at Ordu. Telegrams are accepted for transmission in the Turkish language.

**Vona Bay.**—At the northeastern extremity of Boz Tepesi Promontory there is a steep rocky promontory, Buzuk Kale, separating Ordu and Pershemba Bays. From Buzuk Kale the coast trends westward and northwestward to Vona Point, forming Vona Bay, divided by a rocky point into two portions, named Pershemba and Vona. Vona Bay affords the best anchorages on this coast, and though exposed to winds from north to east-southeastward, little is to be feared from them, as they rarely blow home. The land winds, however, are violent and must be guarded against.

Almost all the sailing craft of Anatolia who find it impossible to haul up on the several beaches winter in Vona Bay, so that in the winter there are collected here as many as 300 vessels, moored head and stern.

**Vona Point Light** (*41° 08′ N., 37° 31′ E.*), fixed white, 118 feet (36 m.) above the sea, visible 12 miles, is shown from a white iron column 22 feet (6.7 m.) high, located 54 yards within the extremity of the cape. For view of Vona Point, see Appendix IX, view W.

**Anchorage.**—In the southern part of Vona Bay there is anchorage in Pershemba Bight, which is rendered conspicuous by an extensive beach bordering the shore between it and Buzuk Kale. About 600 yards from the shore there is a depth of 5 fathoms (9.1 m.), sand and shells, which gradually increases to 20 fathoms (36.6 m.) 1,600 yards from the coast, over a bottom of sand mixed with mud. The anchorages, however, abreast Agsi, where provisions and water are obtainable, 2½ miles northward of Pershemba; of Keshalah, ¾ mile to the northward of Agsi; and Chesme, 1¼ miles southward of Vona Point, are much to be preferred. That of Chesme is considered the best, there being a depth of 10 fathoms (18.3 m.), over sand and mud, with a good holding ground, ¼ mile from the shore.

**Cape Yasun** lies 5½ miles westward from Vona Point, and between them the coast falls back 1 mile, affording an anchorage sheltered from east through south and west winds. The cape, with an old monastery on it, is low, and from a distance of about 30 miles northeastward appears as several hillocks. Khanet Kalessi, a small islet with a tower, lies near the shore between Vona Point and Cape Yasun.

**Shoal.**—A shoal with a depth of 13 feet (4 m.) over it exists ¾ mile northward of the monastery on Cape Yasun. It is locally known as Kharman Kaliya.

**Fatsa Bay and Reef.**—From Cape Yasun the coast turns abruptly to the southwestward for 7 miles, and then curves round to the westward to Karejik Point and to the point beyond, where the Kuchuk Irmak discharges, distant 13 miles westward of Cape Yasun, forming Fatsa Bay, which takes its name from the small town on the western shore, in the center of which is a mosque conspicuous from seaward. Southeastward of the town is the Bulaman Chai, on the east bank of which is a hill with the ruins of a monastery. Fatsa Reef lies 1 mile eastward of Karejik Point and is about 1,200 yards in extent, with 12 fathoms (21.9 m.) to the northward of it. A rock, the remains of an old breakwater, is reported to exist midway between Fatsa Reef and the shore. Mariners are, therefore, cautioned not to use the channel westward of Fatsa Reef. Few vessels frequent this bay, as it is open to the northward and deep, having from 13 to 30 fathoms (23.8 to 54.9 m.) close to the shore.

**Fatsa Bay Light** (*41° 04′ N., 37° 31′ E.*), flashing white, 20 feet (6.1 m.) above the sea, visible 5 miles, is shown from a white openwork iron column located on Fatsa Reef.

**Fatsa**, situated on the eastern bank of Ilekchi rivulet, contains a population of about 3,000 and has a small trade in eggs and nuts. There is a short, brokendown landing stage, but landing is mostly effected on the open beach. There is a telegraph station at Fatsa.

**Unie Bay.—Tashkana Point** (*41° 08′ N., 37° 09′ E.*), which bears nearly due west, 17 miles from Cape Yasun, is bordered by a reef which extends about 200 yards from the shore and has a depth of 5 fathoms (9.1 m.) about ¼ mile from it. About ½ mile westward of Tashkana Point and close to the shore there is a small islet with a church on it dedicated to Agios Nikolaios. On the eastern side of Tashkana Point is Unie Bay, and the point protects the bay from winds westward of northwest if anchored close in, but it is exposed to north and easterly winds.

**Tashkana Point Light**, group flashing white, 62 feet (18.9 m.) above the sea, visible 10 miles, is shown from a white iron column located 300 yards within the extremity of the point.

**Landmark.**—Of the hills within Unie, Mozen Dagh, 2,330 feet (710.2 m.) high, lies over the valley of the Yeshil Irmak and is nearer than the others; from the northwestward it is easily distinguished by its sharp-pointed summit, westward of which are three hillocks and eastward one hillock, all about the same height; from the eastward it appears as a four-toothed saw.

**Anchorage.**—The anchorage abreast the town of Unie is in 5 or or 6 fathoms (9.1 or 11 m.), mud and sand, about ¾ mile from the shore. The depths from this position decrease gradually to the town, over a sandy bottom. A vessel should moor with open hawse to the northeast, as the winds from that quarter are dangerous.

**Unie.**—This town (ancient Œnoe), built in the shape of an amphitheater on the eastern declivity of Tashkana Point, has a handsome appearance, being backed by a range of wooded mountains. It has white two-storied buildings, a large mosque, a building slip, and a market. Fairly large merchant craft are built here. There is a small pier near the customhouse, but landing is usually effected on the open beach. Provisions are obtainable on Saturdays. Steamers call here occasionally. There is a telegraph station in the town.

**Chalti Point—Anchorage.**—From Tashkana Point the shore becomes low and wooded, trending westward and northward to Chalti Point, distance 16 miles. There is a good anchorage in 4 or 5 fathoms (7.3 or 9.1 m.), over a mud bottom, abreast of the Terme River, which empties into the sea 3½ miles to the southward of Chalti Point, but it is exposed to northeasterly winds. Boats may enter the stream to obtain water.

**Chiva Burnu (Iris Point).**—The coast from Chalti Point still continues low and wooded, trending 17 miles west-northwestward to Chiva Burnu. From thence it turns southward and westward to Kalion Point, which lies 14 miles westward from Chiva Burnu and forms Samsun Bay. The Yeshil Irmak (ancient Iris) empties into the sea 3 miles southwestward of Chiva Burnu.

**Chiva Burnu (Iris Point) Light** (*41° 21′ N., 36° 39′ E.*), group flashing white, 75 feet (22.9 m.) above the sea, visible 14 miles, is shown from a white skeleton iron tower 82 feet (25.0 m.) high, located on the point.

**Shoals.**—Between Chalti Point and Chiva Burnu there are shoals, some of which are reported to extend more than 300 yards from the shore; and at the distance of about 1 mile from the coast the depths are variable, with not more than 3 to 4 fathoms (5.5 to 7.3 m.) in some places.

The depth of water off Chiva Burnu is decreasing, there being in the year 1898 only 4¾ fathoms (8.7 m.) at a distance of 2 miles northward of the point. Chiva Burnu should be given a berth of 5 miles.

**SAMSUN BAY** lies between Chiva Burnu and Kalion Point, 13 miles apart in an east and west direction, the head of the bay receding about 5 miles between those points.

Samsun and its anchorage lie in the western part of the bay, between Kalion Point and Dervend Point, 3 miles southward of it.

**Aspect.**—Approaching Samsun, its site may be identified by a dark conical hill over Dervend Point and by two hills above the town; on one of the hills, halfway up, is the conspicuous light yellow hospital. Several spots clear of wood (tobacco plantations) assist in identifying it; also the lighthouse.

**Kalion Point** (*41° 19′ N., 36° 21′ E.*), which forms the northern extremity of Samsun Bay, is low and remarkable for its brownish appearance. It is bordered by sunken rocks or the remains of a mole extending 400 yards offshore, on which the sea breaks heavily at times; there are also several rocks southward along the shore fronting the town, which makes it sometimes dangerous for boats to approach it in rough weather, but toward the battery southward of the town the shore is clean.

A battery stands on Kalion Point, and to the westward may be seen two conical summits of Nabien Dagh.

**Light.**—A group flashing white light, 46 feet (14 m.) above the sea, visible 10 miles, is shown from a white framework structure situated a short distance northward of the battery on Kalion Point.

**Foul ground** exists about 5 miles northeastward of Kalion Point. but it is not dangerous to surface navigation.

**Anchorage.**—Vessels anchor abreast the town in any convenient depth, as there are depths of 3 fathoms (5.5 m), sand, at ¼ mile. and 6 fathoms (11 m.), mud, at ¾ mile from the shore; but this anchorage is only good in summer, as northerly and northeasterly winds make it dangerous during the winter months. A heavy swell generally sets in, which renders it difficult to embark or land goods: yet it is done in a very expeditious manner and a flourishing trade exists.

During strong northeasterly winds steamers should put to sea or have steam ready for any emergency, shifting berth into deeper water southward of the town if too close in.

**Winds.**—The anchorage is exposed to winds from between northwest and east-southeast. In December, January, and February the northeast wind is accompanied by rain, snow, and hail, attaining a force of 9 at times, accompanied by a heavy sea and lasting from four to five days, followed by fine weather for several days, with light breezes from the land.

In March, April, and May rains and fog occur with northeasterly winds, but the wind rarely attains a force of 6. From June to November land hazes prevail up to 10 a. m., and from then to sunset winds from northeast to southeast, reaching a force of 4. A violent southwest wind, which does not last for any length of time, may blow at any season of the year.

**SAMSUN** is the port of the caravan route to Bagdad and the principal commercial center, after Trebizond, on the Anatolian coast.

**Piers.**—The customs pier is 490 feet in length. The other pier is 200 feet in length, and belongs to the Regie tobacco monopoly. Also other piers along the shore, some of which are provided with cranes.

**Supplies.**—Bread, meat, and vegetables of every kind are plentiful. River water may be obtained from the conduits. There is no coal. There are about 10 lighters of 25 tons capacity each.

**Trade.**—The principal local productions are tobacco and grain, followed by oil seeds, camel's hair, wool, fruit, hides, etc. The imports are principally cotton and woolen goods, sugar, and hardware.

**Communication.**—There is frequent communication by steamer with the most important ports up and down the coast.

Telegrams are accepted for transmission in most European languages at the several post offices in the town.

**Climate.**—The climate is warm, but damp. The best time of the year is the autumn; the winter and spring are excessively rainy and the summer exceedingly hot. There are no peculiar illnesses, but fevers occur sometimes. There is a hospital in the town.

**Winds and weather.**—See Meteorological table in Appendix III.

**Coast.**—Westward of Kalion Point there is a long beach backed by hills, followed by lowlands covered with trees, trending northwestward for 14 miles to the roadstead of Kumjughaz, which is well spoken of and lies abreast of the mouth of a large lake known as Lake Hammamli or Ak Göl. Northward of Kumjughaz is Injir Point, and beyond it Halys Point. The whole of this low coast and for about 17 miles westward of the latter point to Alacham rivulet is covered with trees, and forms the plain and valley through which the Kizil Irmak finds its way to the sea at Halys Point. Ak Göl, between Injir Point and the river, is 13 miles in length and extends from Kumjughaz nearly to Halys Point.

**Kumjughaz Road** has a depth of 6 fathoms (11 m.) over a muddy bottom, at 2 miles from the shore, but the anchorage is exposed to winds from north to east-southeast. All this coast is said to be clean, having a depth of 10 fathoms (18.3 m.) at from 1½ to 3 miles off, but the chart has but few soundings on it. The houses of Kumjughaz will be seen from the anchorage among the trees on both sides of the stream.

**Halys Point (Cape Bafra)** is the northern extremity of the promontory and plain above referred to. Here the Kizil Irmak discharges by two mouths about 1 mile apart. The trees extend close down to the point, while on either side are sandy beaches fronting them.

**Light** (*41° 44′ N., 35° 59′ E.*).—A flashing white light, 82 feet (25 m.) above the sea, visible 14 miles, is shown from a white iron framework tower 82 feet (25 m.) in height on the left bank of the western branch of the river at Halys Point.

**Wreck.**—About 1 mile northeastward of the point lies a stranded steamer with four masts and a funnel above water, very conspicuous from seaward and reported to be visible long before the lighthouse is sighted (1920).

**Kizil Irmak** is the largest river on the Anatolian coast. Its source is in the Taurus Range, and before reaching the sea it flows past Bafra town, which is noted for its tobacco plantations. In spite of its size it is not navigable; in its lower course it is only available for boats. At about 2 miles from the sea it bifurcates, and the two mouths are about 1 mile apart.

**Aspect.**—A good mark for the mouths is the lighthouse, but from a long distance Nabien Dagh, 4,280 feet (1,304.5 m.) high, with a broad top when seen from the northward and as a bifurcated cone from the northwest, and situated inland on the meridian of the mouth, is a good mark. It is probable that the delta of the river is extending seaward, so that vessels should not approach the lighthouse within a distance of 2 miles. In 1920 the water 6 miles eastward and northeastward of the lighthouse was observed to be much discolored by sand and mud.

Katran Dagh, 5,440 feet (1,658.1 m.) high, about 16 miles southwestward of Bafra town and 13 miles within the coast line, is also a good mark for the neighborhood. It shows a double cone from most views, and may be seen from a distance of 50 miles or more.

From Chai Agsi Point, northward of Katran Dagh, the hilly coast trends northwestward past Gherzeh to Cape Sinub.

**Coast.**—Westward of Halys Point the coast trends west for 18 miles to the Alacham River and is low and wooded. Thence in a northwest direction the coast is bordered by mountains as far as Cape Sinub; the bay between is 39 miles across and recedes 15 miles from the line of its points. In the northwest corner lies the town of Sinub.

**Kusafa** lies 8 miles from Chai Agsi, and the bight southward of it affords anchorage in 8 to 9 fathoms (14.6 to 16.5 m.), with winds from between north to east-southeast. Coasting craft ship timber here.

**Gherze.**—This little town (ancient Carusa) stands on a low, prominent point at the foot of a high mountain about 5 miles northwestward of Kusafa. A reef extends about 200 yards off the point and borders the coast as far as the town to the distance of 100 yards. There is a telegraph station in the town. Water is obtainable at the quay. Small craft are built here and firewood prepared for shipment.

**Anchorage.**—The anchorage in this roadstead, in depths of 5 to 7 fathoms (9.1 to 12.8 m.), mud and sand, about 800 yards from the shore, is said to be safe with Cape Sinub just open. A small vessel anchored in 3 fathoms (5.5 m.), mud and shells, at about 400 yards southward of the town will be sheltered by the point from northerly winds.

**Cape Sinub** (*42° 03′ N., 35° 12′ E.*) is the northeastern extremity of the peninsula of Boztepe, 700 feet (213.4 m.) in height, which projects about 3 miles to the eastward from a narrow isthmus connecting it with the mainland and on which stands the town of Sinub (ancient Sinope). In whatever direction the cape is approached it may be easily recognized by the peculiar form of the peninsula, the summit of which is flat and the sides steep, except toward the isthmus. The towers of the castle, then the castle itself, and then the town will appear. The isthmus is scarcely visible from a distance, so that the peninsula will make as an island from north and south directions.

**Boztepe Point.**—A conspicuous rock, known as the islet of Sts. Peter and Paul, lies about 400 yards northeastward of Boztepe, the southeastern extremity of the peninsula. The rock is steep-to, with a depth of 10 fathoms (18.3 m.) between it and the point.

The northern shores of the peninsula are clean, but a vessel in running or turning to windward along the southern shore must not approach within the distance of 200 yards.

The only landing place on the south side of the peninsula is at the ravine with a beach, below Adaköi.

**Sinub (Sinope) Light,** group flashing white, 351 feet (107 m.) above the sea, visible 10 miles, is shown from a white stone tower located on Boztepe Point.

**Anchorage.**—The roadstead southward of the isthmus is good even in winter and is the safest anchorage between the Bosporus and Batum. It is exposed only to winds from between south and east, which are not dangerous. Vessels anchor in 5 to 10 fathoms (9.1 to 18.3 m.), mud and sand, from 200 to 800 yards southward of the town, quite sheltered from westerly and northeasterly gales. The shore can be approached to the depth of 3 fathoms (5.5 m.), but within that off the town the bottom is foul for a distance of 100 yards with the remains of ancient jetties. Boats landing should be careful to avoid them. The depth alongside the various jetties in the harbor is not more than 3 feet (0.9 m.).

**Fogs** are most frequent in the month of May.

**Local magnetic disturbance.**—Magnetic disturbance amounting to 2½° has been experienced near Sinub.

**SINUB (SINOPE).**—This town, formerly the capital of Pontus, is divided into two distinct parts. The first, the fortress, the walls of which are washed by the sea, is built on the isthmus. The second stands on the slope of the peninsula. It has a population of about 8,000.

**Trade.**—The exports consist of grain, tobacco, linseed, chestnuts, timber, sheepskins, haricot beans, rice, flax, fish oil, salt fish, etc. The imports are flour, coal, and hardware. Shipbuilding was formerly the principal industry. There are now no facilities for repairing vessels, and the town has no commercial importance.

**Supplies.**—Fresh provisions can be obtained.

**Communication.**—Turkish steamers to and from Constantinople call at irregular intervals. Telegrams are accepted for transmission in either French or Turkish.

**Quarantine.**—On a height in the eastern part of the town are the hospital barracks of the Sanitary International Commission; steamers are sent here from Constantinople during epidemics to carry out the established quarantine.

**Ak Liman.**—This little port (ancient Armene) lies 5 miles west-northwest of Sinub at the extremity of a low and sandy shore, which is backed by mountains bordered by white rocks. It is about ½ mile long in a northwest and southeast direction and is about 800 yards wide in its widest part, but the entrance is narrowed to ¼ mile by two islets which lie off the points; both have short sunken reefs extending into the entrance, and there are sunken reefs between them and the shore. The port, which is open to the eastward, has from 5 to 7 fathoms (9.1 to 12.8 m.) at a little distance within the entrance. Nearer the bottom of the port there is a depth of 2 and 3 fathoms (3.7 and 5.5 m.), in the northern part of which vessels of light draft will find shelter from all sea winds with 2 fathoms (3.7 m.) water 300 yards from the shore. There is a landing jetty on the southern shore.

**Coast.**—**Reef.**—Beyond Ak Liman the coast becomes bold and rocky and trends north-northwest for 3 miles, forming three points, the northern of which is Pakhios Point, a rocky bluff. About 1 mile north of Ak Liman is a reef ½ mile from the shore. From Pakhios Point the coast trends westward to Cape Inje, which is 3 miles.

**Cape Inje** (*42° 06′ N., 34° 58′ E.*) and Pakhios Point, the most northern points of Anatolia, are of a reddish tint and free from danger. The cape is low, sharp, rocky, and slightly lower than Pakhios. Capes Inje and Sinub form a remarkable feature of the coast, dividing the eastern and western parts of Anatolia.

**Cape Inje Light,** fixed and flashing white, 92 feet (28 m.) above the sea, visible 14 miles, is shown from white stone tower located near the extremity of the cape. (Reported irregular, 1925.)

**Kildi Reef.**—From Cape Inje the coast turns abruptly to the southward and southwestward, whence it takes a westerly direction to Kerempe Burnu, which lies 76 miles westward from Cape Inje. A bed of rocks, named Kildi, about 2 miles in length from east to west and at least ½ mile in breadth, lies 13 miles southwestward from Cape Inje. Its outer edge is about 1 mile from the coast. Its eastern end is off the valley of Kaza Kildi, which is covered with buildings, and another inhabited valley is nearly abreast of the reef.

Between Kildi Reef and Istifan Point is Aianjik Valley and rivulet, with several buildings, abreast of which coasting craft anchor.

**Istifan (Stefano) Point.**—**Anchorage.**—Istifan Point is a small projection of the coast lying 21 miles to the westward of Cape Inje. There is anchorage abreast of the town, which stands southeastward of the point, sheltered from northwest winds, but open to the northward and northeastward. The depths are from 3 to 5 fathoms (5.5 to 9.1 m.), sand and mud.

**Antonios Point.—Anchorage.**—Antonios Point, situated 6½ miles westward of Istifan Point, has some buildings and a rivulet eastward of it. The anchorage is to the eastward of the rivulet in 3 or 4 fathoms (5.5 or 7.3 m.), mud and sand, but it is exposed to all winds from seaward.

**Apana.**—From Antonios Point the coast takes a westerly direction for 8 miles to Kinogli Point, off which rocks extend northeastward above and below water.

At Oghlu Iskelesi, 5 miles westward of Kinogli Point, is a building slip for small craft. At a short distance off it is a detached precipitous rock. From thence the coast continues westward for 3 miles to Apana, off which coasters sometimes anchor abreast of the village and rivulet. Small craft haul up on the beach.

Ilki and Evreniea villages lie between Apana and Ineboli.

**Ineboli (Niopoli).**—Ineboli, a low, projecting point, is situated 11 miles westward of Apana. And old broken-up mole and a reef extend about 600 yards off it, sheltering the roadstead to the eastward abreast of the town of Ineboli. Vessels may enter the road during the night, but are not granted pratique after sunset.

**Cape Ineboli Lights** (*41° 59′ N., 33° 45′ E.*), two fixed white lights in a vertical line, the uppermost 85 feet (25.9 m.) above the sea, visible 10 miles, are shown from a white iron mast on top of a small white dwelling located about 55 yards within the extremity of the point.

**Fogs** are frequent from March to May.

**Anchorage.**—Small craft anchor eastward of the point and reef in 3 to 4 fathoms (5.5 to 7.3 m.), but little shelter is afforded by it. Steamers visiting the road, especially in the winter months, are at times obliged to put to sea without discharging their cargo. The usual anchorage is westward of Ineboli Point, off the commercial and newer part of the town, in from 10 to 16 fathoms (18.3 to 20.3 m.), over sand and mud.

**INEBOLI**, which stands on the southern shore of the roadstead at the mouth of a ravine spanned by a girder footbridge, has a population of about 9,000. There is a wharf on the eastern side of the mole where boats can land, with a depth of 2 feet (0.6 m.) alongside.

**Supplies.**—Fresh provisions can be obtained; there is no coal obtainable.

**Trade.**—The exports consist of wool, grain, timber, copper, etc. The imports are chiefly manufactured goods.

**Communication.**—The steamers of the various lines running between Constantinople and Batum touch at the port. There is also postal and telegraphic communication.

**Hospital.**—There is a military hospital, to which seamen are admitted.

**Coast.**—Westward from Ineboli the coast hills are cultivated to their summits. In places buildings may be seen. Between the valleys of Zarpana and Kariani is a conspicuous barren square rock overhanging the sea. Mezet village and Fakaz Point lie between Kariani and Kerempe Burnu, with an exposed anchorage between them.

In the small settlements in these valleys there are no minarets and the coast is covered with vegetation to the water's edge, whereas to the eastward of Ineboli the coast is bluff, with barren rocks, and in the settlements there are minarets. Zarpana Valley, in which is a rivulet, 8½ miles westward of Ineboli, is covered with trees, among which may be seen buildings.

**Kerempe Burnu,** situated 22 miles westward of Ineboli, is the western termination of the most prominent land of the Anatolian coast, of which Sinub is the eastern extremity. This cape, one of the highest in the Black Sea, is bordered by reddish cliffs, with cultivated land within. A saddle hill southeastward of the cape assists in identifying the cape, as well as the lighthouse, but the latter in winter, when the land is covered with snow, is merged with it, except when seen from the eastward or westward.

Kerempe Burnu is 140 miles distant from the southern extremity of the Krimea, and these to promontories divide the Black Sea into two parts, the eastern and the western, which are often very distinct by the different winds blowing at the same time in each.

It frequently happens off the cape that the wind entirely changes its direction, so that a vessel approaching with a fresh northwesterly breeze may when passing the point encounter a northeast wind, and vice versa, and as gales are frequent off the cape sailing vessels usually give it a wide berth. See Appendix IX, view X.

**Kerempe Burnu Light** (*42° 02′ N., 33° 17′ E.*), alternating flashing white and red, 262 feet (79.9 m.) above the sea, visible 20 miles, is shown from a white circular tower, white one-story building with red roof adjacent, located 110 yards within the extremity of the cape.

**Caution.**—The lighthouse is reported to lie farther eastward than charted (1920).

**Coast.**—From Kerempe Burnu the coast is elevated, broken up by valleys with sandy beaches, and safe to approach. It trends in a general west-southwest direction for 95 miles to Cape Baba.

**At Timli Point,** 5½ miles westward of Kerempe Burnu, is a hill with ruins of a fortress on its summit and a detached rock close to the shore. There are sandy beaches on both sides of the point; the western one borders Timli Bight.

**Ulon Kerempe,** at 7 miles westward of Kerempe Burnu, is situated eastward of a narrow point with gray cliffs. On either side of it the coast falls back, the westernmost bight being the larger, in which may be seen a settlement; within it is a conspicuous round hill.

**Jidde (Karaagach).**—The village of Jidde, where formerly vessels of considerable size were built, lies 14 miles from Kerempe Burnu. The anchorage is protected from westerly winds by the point of the same name, which terminates in a bluff. Vessels obtain shelter here in a depth of 13 fathoms (23.8 m.), mud, or near the shore in 3 fathoms (5.5 m.) over sand. It is exposed to north and westerly winds and is only used by coasters. Mount Fulo lies 2½ miles southeastward of it.

**Coast.**—Between Jidde and Kidros the Sal Deresi falls into the sea through the valley of the same name; on the eastern side of the valley is a mountain 3,210 feet (978.4 m.) high, which serves to identify the locality. The depth is about 12 fathoms (21.9 m.) at 1¼ miles offshore. The coast is sandy between Jidde to some distance westward of the Sal Deresi Valley, whence it becomes rocky to Kidros.

**Kidros.**—The little port of Kidros, 4½ miles westward of Jidde is backed by a mountain in the form of a sugar loaf which assists in identifying it. The port is 600 yards in length with a breadth of about 400 yards and an entrance 150 yards wide; it is divided by a sunken rock 100 feet in extent, with a depth of 9 feet (2.7 m.) over it, with a fairway depth on either side of about 7 fathoms (12.8 m.), decreasing to 35, 20, and 18 feet (10.7, 6.1, and 5.5 m.) within the port. Small craft visit the port for timber in the summer months, but the entrance is difficult, and no vessel should attempt to shelter here during a strong sea breeze except in case of necessity. The port will accommodate five or six small craft in 3 to 4 fathoms (5.5 to 7.3 m.), but it is exposed to northerly winds.

In entering keep the eastern shore aboard, to avoid the rock in the farway.

**Kano Su** is a valley situated about 6 miles westward of Kidros and may be made out from the northward from a distance of 20 miles. On its eastern side rises Kapu Dagh, a high hill with a sharp summit, which is conspicuous from seaward. There are a few houses on the western side of the valley.

The coast westward to Delikli Point presents no special feature. Two hillocks may indicate the position of Tekoi Oyunu village in the valley between them.

Delikli Point may be distinguished by a detached rounded height precipitous toward the sea, forming its extremity.

**Chakras Burnu,** 2¾ miles eastward of Amasra, is a dark, precipitous bluff 1,390 feet (423.7 m.) high and a useful landmark for Amasra when approaching it.

**Amasra.**—Amasra Bay, 23 miles to the westward of Kidros, is formed between Chakras and the town of Amasra (ancient Amastris), which appears at a distance like a group of islets. The town stands on a double peninsula, the eastern part of which is ¼ mile in length from east to west, connected with the mainland by a low, sandy isthmus about 200 yards in breadth. The western part is joined to the eastern by a narrow bar, over which the sea breaks in heavy weather; a bridge spans it. There are half-demolished batteries with several old guns on the isthmus connecting the peninsula with the mainland. About 200 yards northward of the eastern peninsula there is an islet 340 yards in length from north to south, of moderate height and with bold, yellow shores. Between it and the town there is a depth of 9 to 14 fathoms (16.5 to 25.6 m.).

**Amasra Light** (*41° 45′ N., 32° 25′ E.*), flashing white, 312 feet (95.1 m.) above the sea, visible 16 miles, is shown from a white stone tower located on the northwest summit of the peninsula.

**Anchorages.**—The best anchorage, about 600 yards in extent, is that southeastward of the town, abreast of the isthmus, in 8 to 3 fathoms (14.6 to 5.5 m.), sandy bottom, protected to the northward by an islet which is connected to the peninsula by a ridge of rock. A reef extends 200 yards eastward of the point of the islet, which serves to break the force of the sea with northerly winds. On the southern shore of this anchorage, off two points 600 and 1,000 yards eastward of the peninsula, shoals extend 200 yards and are said to be the remains of ancient jetties; the extremity of the latter is marked by a spherical buoy; but the eastern portion of Amasra Bay is clean, having from 4 to 10 fathoms (7.3 to 18.3 m.) close to the shore, over sand and mud.

A cove 200 yards in length lies westward of the isthmus, but the anchorage is inferior to the eastern one and exposed to westerly winds. The entrance, 200 yards in breadth, is much narrowed by rocks which fringe the northern and southern shores. It has from 2 to 8 fathoms (3.7 to 14.6 m.), over a sandy bottom. It is, however, a favorite anchorage for small craft in the summer months, because at that time easterly winds prevail and the swell caused by them does not enter it.

**Amasra** is surrounded by thick walls and has a population of about 2,500. Supplies of provisions are obtainable. There is steamship service with Constantinople and ports on the Anatolian coast. Other steamers call occasionally. There is a shipbuilding yard, where merchant craft are built.

**Coast—Bartin Su.**—The Bartin Su reaches the sea 7½ miles to the southwestward of Amasra and near a point of the same name remarkable for its white patches. There is a depth of 3 fathoms (5.5 m.) near the shore and 8 feet (2.4 m.) on the sand bar at the mouth of the river, the channel over which is narrowed by rocks on both sides. The river has a width of 175 to 350 feet. The greatest depth over the bar in summer, without rains and when the current is imperceptible, is about 9 feet (2.7 m.). Inside the water deepens to 4 and 5 fathoms (7.3 and 9.1 m.). The river is available for coasters as far as Bartin village, which is situated 2 miles from its mouth. There are 10 mosques in the village, which is considered a large one compared with others on this coast. The trade is chiefly in timber, but small craft are built here.

Ghizelji Hissar is a slight projection of the coast 6 miles southwestward of Bartin Point, and between it and Philias Point, a low point with reddish slopes which lies nearly 8 miles farther on, there is a beach 6 miles in length. Kilimli Point, which projects a little from the coast, is high and lies 4 miles to the westward of Philias Point, the coast between them receding slightly to the westward.

Philias Chai has a depth of 6 to 7 feet (1.8 to 2.1 m.) in its eastern entrance, which depth continues up for a distance of about 600 yards. The western entrance is shallower. The stream is only available for small coasting craft.

The coast between Kilimli Point and Sungul Bay, a distance of about 9 miles, is backed by a number of sharp-pointed hills, which rise gradually towards Sungul Bay.

**Zunguldak (Sungul) Bay,** although open to the north and west, affords fairly good anchorage in about 13 fathoms (23.8 m.) sand and mud over rocks, and well protected from northeasterly winds.

The most conspicuous objects when approaching Sungul are a radio mast situated on the hill above the town, and a minaret and a tall stone chimney on the south side of the bay.

**A light** (*41° 28′ N., 31° 49′ E.*), flashing white, 174 feet (53 m.) above the sea, visible 19 miles, is shown from a white masonry tower located on the northern entrance point to the bay. (See Light List.)

**Harbor.**—There is a small artificial harbor in the northern part of the bay, protected by a breakwater 330 yards in length, within which are depths of 5 to 7 fathoms (9.1 to 12.8 m.).

**Light.**—A fixed red light with a white sector, 30 feet (9.1 m.) above the sea, visible 8 miles, is shown from a square iron truss 20 feet (6.1 m.) in height on the head of the breakwater. (See Light List.)

**Shoal.**—A rock, with a depth of 1¼ fathoms (2.3 m.) over it, is situated on the eastern side of the harbor 100 yards southwestward from the end of the pier near the quarantine station. It is marked by a can buoy.

**Wreck.**—The wreck of a barge lies sunk southeastward of the head of the breakwater. A signal flag about 38 yards southeastward of the head of the breakwater marks the point where the stern lies in about 3½ fathoms (6.4 m.).

**Buoys.**—There are mooring buoys laid down in the entrance to the harbor, and also off the pier near the quarantine station. These buoys are not charted.

**Regulations.**—Vessels desirous of entering the harbor must, as soon as they are within sufficient distance to be seen, hoist at the masthead a rectangular flag colored vertically half red and half white, with the white to the mast.

**Pilots.**—The Heraclea Co. sends a boat to vessels arriving with a competent pilot, who will berth them at the quay or take them to an anchorage where coaling can be carried out.

**Tugs.**—There are two tugs stationed at Sungul Bay.

**ZUNGULDAK (SUNGUL).**—The town of Sungul is situated on the eastern shore of the bay.

**Coaling berths.**—There are berths for two steamers alongside the breakwater in a depth of 25 to 27 feet (7.6 to 8.2 m.), where there are two steam cranes which will load from 80 to 100 tons of coal an hour and a transporter which will load a vessel at the rate of 200 tons an hour, the railroad cars being lowered into the vessel's hold.

Vessels can also lie on the opposite side of the harbor at the pier near the quarantine station, where there is a depth of 25 feet (7.6 m.) under a steam crane. Rough weather prevents coaling alongside at times.

Vessels requiring only a moderate amount of coal for their bunkers coal in the bay from lighters, when 60 or 70 tons an hour can be taken on board.

**Supplies.**—Fresh meat, vegetables, and water can be obtained.

**Trade—Coal.**—Sungul is the principal place for exporting the coal mined in the district extending along the coast for many miles on either side of Sungul, and which is known as the Heraclea Basin. The output is about 600,000 tons per annum. There is always a stock of about 1,000 tons on hand, and the class of coal is between that of Cardiff and Newcastle coal.

**Communication.**—There is a telegraph office and post office in the town.

**Koslu Bay.**—The locality of Koslu Bay, which lies about 2 miles southwestward of Sungul Bay, is best distinguished by the houses near the shore. The land about it presents no remarkable object, the coast being generally bordered by high mountains covered with forests.

**Anchorage.**—The roadstead affords a summer anchorage for steamers and coasters in depths according to draft. Traders resort to it after May (before which violent storms frequently occur) for the shipment of coal, anchoring northeastward of the valley to get better shelter from the point, the wind being generally to the eastward of northeast. The bottom is sand under the depth of 12 fathoms (21.9 m.), with mud and sand in deeper water. The western extremity of the land kept open of Alesso Point will lead to a good berth at ¼ mile from the shore, but to expedite the embarkation of coal a nearer berth may be taken.

**Coal.**—Koslu Valley is one of the principal localities for coal mining in the Heraclea Basin, the other mining centers being Chatal Aghzi, Kilimli, and Sungul Valleys to the northeastward, and Chamli and Kandilli Valleys, near Bender Eregli, to the southwestward. The coal is similar to the Sungul Valley coal in quality and appearance.

It is shipped at Koslu into lighters from a small pier, alongside which there is a depth of 11 feet (3.4 m.). From 600 to 700 tons can be loaded in a day when the weather is favorable.

At Chatal Aghzi and Kilimli the coal is loaded into lighters and towed round to Sungul Bay for shipment.

**BENDER EREGLI BAY—Cape Baba.**—From Koslu Bay the coast, hilly, wooded, and intersected by many ravines, trends 17 miles southwestward to the promontory of Cape Baba, which is faced with rocky cliffs and rendered remarkable by the sunken change in the aspect of the coast southward of it.

Southeastward of the cape is the bay of Bender Eregli, which is about 2½ miles in length from Cape Baba to Karasakal Point, its southern point, with a depth in the middle of 10 fathoms (18.3 m.), over sand and mud, shoaling gradually to the shore.

**Alaja (Evlidge) Point Light,** group flashing white, 252 feet (76.9 m.) above the sea, visible 15 miles, is shown from a white masonry tower 29 feet (8.8 m.) high located on the northern extremity of Cape Baba and on the western side of Kisi Agsi Bay. (See Light List.)

**Cape Baba Light** (*41° 18′ N., 31° 26′ E.*), fixed red, 78 feet (23.8 m.) above the sea, visible 5 miles, is shown from a white mast on the red roof of a white house located on the south point of the cape west of Bender Eregli (Heraclea).

Two fixed white lights are shown from the head of a wooden mole near the southern end of the fortress. (See Light List.)

**The roadstead** is spacious and accessible to large vessels. It is exposed to winds from between northwest by north through west to south, and affords secure anchorage only with winds from between northeast and southeast. In winter the northeast is the prevailing wind. It is the nearest anchorage to the Bosporus in which a large vessel may obtain shelter, and it is very important to mariners, because during northeasterly winds the entrance into that strait is usually hidden by mist, and vessels wait here for favorable weather.

The depth in the roadstead ranges from 3 to 9 fathoms (5.5 to 16.5 m.), mud and sand. Its shores are free from danger other than a reef which stretches about 150 yards off Cape Baba.

There is a depth of 4 fathoms (7.3 m.) at 400 yards southeastward of the ancient mole at 200 yards from the shore, where small vessels may anchor sheltered from west-northwest round by north to about south.

**Anchorages.**—It is not a safe anchorage in a west or northwest gale unless well up in the bay, between Cape Baba and the ancient mole, in depths of 3 to 4 fathoms (5.5 to 7.3 m.); there some shelter may be obtained from those winds. Country vessels lie moored head and stern here during the whole winter and are said to be perfectly safe from every gale, although exposed to some fetch from the southwest.

The anchorage for large vessels is in about 6 fathoms (11 m.) at 800 yards east-southeastward of Cape Baba.

**Caution.**—The wrecks of 20 vessels are reported to lie within the limits of the anchorage. (See chart.)

**BENDER EREGLI** (*41° 18′ N., 31° 27′ E.*).—The town (ancient Heraklea), which has a population of about 10,000, stands on the northeast shore of the bay ¾ mile eastward of Cape Baba, and was formerly of considerable extent. There was a castle and a mole, both of which are now in ruins. The greater part of the area occupied by the town is covered with gardens and trees, amid which may be seen the tiled roofs of the houses. The town is inclosed on three sides by an old wall, while on the eastern side is an inaccessible cliff. The remains of the ancient mole, about 400 yards in length, extend in a south-southwest direction from a battery which stands on the shore about ¾ mile east-southeast of Cape Baba.

**Pier.**—There is a pier at the southwest part of the town, near the mosque and quarantine station.

**Supplies.**—Fresh meat, vegetables, and bread can be obtained. Water is good and plentiful, and is obtainable from a fountain near the pier.

**Trade.**—The trade is insignificant. Timber is exported. There is a small shipbuilding yard.

**Coal.**—The Chamli and Kandilli mines, situated about 10 miles from Bender Eregli, have an output of about 100,000 tons annually. This coal is said to have a heating power nearly equal to the best Welsh coal. Caiques are employed during the winter, when the weather permits, to bring coal to this bay from all the valleys, where it is piled. From 700 to 800 tons in the summer and from 3,000 to 4,000 tons in the winter are usually in stock at Bender Eregli.

Coaling is performed by means of lighters; from 300 to 400 tons per day can be put on board.

**Communication** with Constantinople and Anatolian ports is carried on by steamers of a Turkish company.

**Coast.**—Kirpen (Kerpe) Point lies 52 miles westward of Cape Baba, and between them the coast falls back nearly 12 miles to the southward, forming a deep bay into which discharge three rivers, named Akche, Milan, and Sakaria. The coast is formed by several ranges of hills and valleys between them, requiring no special mention. Westward of the Milan Su, which flows into the sea 24 miles southwestward from Cape Baba, the coast is backed by mountains and fronted by a beach 27 miles in length, which terminates at Chalbi Point, where the mountains again border the shore.

At the Akche there is a settlement. Vessels arriving for timber anchor abreast the eastern sheds, eastward of the settlement, at 1½ miles offshore in a depth of 10 fathoms (18.3 m.), over sand, exposed to all onshore winds. Mutton and poultry are obtainable, and fresh water from the brooks.

The coast westward to the Milan Su consists of wooded slopes. The river may be recognized when coming from the westward by the hills on that side of the valley sloping gradually, while those on the eastern side are abrupt.

From the Milan to Chalbi Point, a distance of 28 miles, with the **Sakaria Irmak** between, the coast is low and the hills recede, again approaching the coast at Chalbi Point.

The coast between Chalbi Point and Kirpen Adasi is fronted by rocks.

**Sakaria (Sargonius) Irmak.**—The mouth of the Sakaria is situated 13 miles westward of the Milan Su. There is a depth of 3 to 5 feet (0.9 to 1.5 m.) on the bar, whence the river has a depth of 3 fathoms (5.5 m.) for a distance of 8 miles, with an average breadth of about 100 yards and a depth of about 3 fathoms (5.5 m.).

This river has a rapid current, which discolors the water for some distance seaward. The masts of the small craft within the bar are visible from seaward. The mosque at the settlement at Karasu village, eastward of the river, helps to identify the locality. Vessels coming here for timber anchor in about 10 fathoms (18.3 m.), over a mud bottom.

**Kirpen (Kerpe) Adasi** (*41° 13′ N., 30° 17′ E.*) is low, about 400 yards in extent, and lies about 400 yards northward of Kirpen Point, with a small islet close westward of it. There are the remains of an old fort on the island. The point is bordered by white cliffs and a spit extends a short distance off it, and a similar one extends from the island; the water is deep between, but only local craft should pass within the island. See Appendix IX, view Y.

**Light.**—A flashing white light, 69 feet (21 m.) above the sea, visible 8 miles, is shown from a white metallic framework structure on the western extremity of Kirpen Adasi. (See Light List.)

**Shoal.**—Shoal ground extends 250 yards westward of the lighthouse on Kirpen Adasi.

**Wreck.**—The wreck of the steamer *Iris Agzi*, with mast showing above water, lies sunk about ½ mile westward of Kirpen Adasi.

**Aspect of the coast.**—From a position 10 miles northward of Kirpen Adasi in clear weather Mount Agvah, a high-peaked mountain some distance to the westward and 6 miles from the coast, may be seen bearing about southwest, and an isolated peak about 30 miles inland, bearing 191°, nearly over the two peaks of Mount Kandra, which are about 700 feet (213.4 m.) high and covered with trees, and back the anchorage of Kirpe; also Kirpen Adasi Lighthouse. These observations may be useful, as the land in the vicinity of the point is said by some mariners to resemble the entrance to the Bosporus, some 50 miles to the westward.

**Kefken Bay** is formed between Kirpen Point and a point 2 miles west-southwestward of it. It is sheltered from the northeastward by Kirpen Adasi and the spits extending from the island and from the mainland before mentioned. Small craft anchor in about 7 fathoms (12.8 m.), sand, close under the point.

**Shoals.**—A rock above water lies close eastward of the southwest point of the bay, and a shoal, known as Kefken Shoal, about 1,000 yards 78° from the eastern extremity of the same point at about 400 yards offshore.

**Anchorage.**—The islands and point are safe to approach, avoiding the shoal extending 200 yards westward of the shore at the lighthouse, and vessels anchor near Kirpen Point, protected by the islets from northerly and easterly winds, in 6 to 7 fathoms (11.0 to 12.8 m.), but the bottom is rocky in places. About 1 mile southwest of Kefken Bay is an inlet named False Kefken, but it is not used, being encumbered with reefs.

**Kerne and Kirpe Bays** lie about 2 and 3 miles, respectively, southwestward of Kefken Bay. Kerne Bay has a depth of 3 to 4 fathoms (5.5 to 7.3 m.), and affords shelter from the northward, and small craft protect themselves under a low point from westerly winds. A bold headland separates Kerne Bay from Kirpe Bay to the southwestward, and the latter bay, which is about ¾ mile in length from east to west, is much preferred to the preceding one. In rounding the northern headland give it a wide berth to avoid the rocks which lie to the southward of it, and anchor in about 4 fathoms (7.3 m.), sheltered from all but westerly winds.

There is a well of good water here. Native craft take firewood from this and other bays.

Bashna Island, 4 miles westward of Kirpe Bay, has the ruins of a fort on it and forms the western entrance point to Sirek Bay, used by small craft, which are hauled up on the beach to protect them from the surf. There are a few small houses on the western shore of the bay.

A small rocky islet 6 feet (1.8 m.) high and 80 yards in length lies 1½ miles westward of Kirpe Bay and about 900 yards from the shore, with depths of from 6 to 9 fathoms (11.0 to 16.5 m.).

**Aspect.**—Southward of Kirpe Bay is Mount Kandra, previously mentioned, which is visible from a distance of about 36 miles. At 15 miles farther westward and some 6 miles within Agvah is Mount Agvah, previously described.

**Kilia Burnu.**—From Kirpe Bay the coast trends in a westerly direction for 27 miles to Kilia Burnu, which slopes gradually toward the sea, terminating in a little chain of islands evidently forming at one time a portion of it.

**Landmark.**—On the summit of the largest of the islets or rocks off the point stands an old square tower, once part of a large castle, the ruins of which lie all round. The whole of the sea face of this ruin has been painted white as a landmark for identifying the approach to the Bosporus should a vessel be too far eastward, and is seen in clear weather at a considerable distance from all directions seaward. A conspicuous minaret about 196 feet (59.7 m.) high stands in the town.

**Kilia Burnu Light** (*41° 11′ N., 29° 37′ E.*), flashing white, 220 feet (76.9 m.) above the sea, visible 21 miles, is shown from a pink stone tower 49 feet (14.9 m.) high located about 109 yards from the extremity of the point. The lighthouse is very conspicuous from all directions seaward.

**Anchorage.**—Vessels may pass westward of the rocks at a distance of 200 yards, and the depths decrease gradually towards the shore. The best position for anchorage is just within the outer rock, in a depth of 5 fathoms (9.1 m.), or nearer the town in 3 fathoms (5.5 m.); the bottom is hard white sand.

The bay to a stranger would seem to offer shelter in a northeast gale, as the cluster of islets appear to form a natural breakwater, but the sea rushes between them at such times with great fury and would render any attempt to ride out a gale extremely hazardous, more especially as the islets are surrounded by foul ground and the water shoals rapidly in the bay. It has been further observed that a strong undercurrent setting to the eastward often causes a vessel to lie across the prevailing wind, making the anchorage unsatisfactory, the holding ground being poor.

**Lifeboat.**—A lifeboat and rocket station is established in the bay southwestward of the lighthouse.

**Kilia,** built on the top of the point, is of considerable size and exports large quantities of charcoal and stones for building purposes. Mutton, eggs, vegetables, and fruit at times may be obtained. Fresh water may be had from a well on the shore.

There is telegraphic communication with Constantinople.

**Marah Burnu.**—From the west end of Kilia Bay a range of hills extends along the shore as far as Marah Burnu, 5 miles. A few yards below the summit on the western slope of these hills is the mouth of a remarkable cave, which has given its name to the place. This cave runs a long distance inland, though the passage is very small and not sufficient to admit a man in an upright position.

**Allajali.**—From Marah Burnu the hills recede about 1½ miles from the shore, having a low, sandy piece of land at their foot, which about halfway between Marah Burnu and Kara Burnu stretches slightly into the sea, forming the sandy point of Allajali.

**Rocket station.**—On the eastern slope of Allajali Point stands a rocket house painted white, with black gable ends.

**Coast.**—The sandy coast terminates at Armankiang, within 1½ miles of Kara Burnu, where there are a few chalk cliffs, from the top of which the ground rises gradually to the summit of the range of hills of which Kara Burnu is the termination of a spur.

Between Kilia and Kara Burnu the shore is fringed with reefs and should not be approached within 1 mile, as under that distance the water shoals rapidly and is at times a dangerous (lee) shore.

**Rocket station.**—At Armankiang, above the chalk cliffs, stands a rocket house painted white, with black gables.

**Kara Burnu—Landmarks.**—Kara Burnu slopes and narrows gradually as it stretches into the sea, but near its termination suddenly rises and swells out, forming a mound which has a curious appearance, as the earth having been washed away from the top, the bowlders of which it is principally comprised stand up like the stones of a cemetery. The sea face of this mass of bowlders has been painted white, as well as a cliff of greater elevation a few yards eastward of the point, and thus from the northward two patches are seen; in other directions only one. Foul ground extends around the point to the distance of 200 yards.

**Rocket station.**—A few yards westward of the rising ground overlooking the mound or rampart is a rocket station painted white, with black gable ends, as are all the rocket stations on the Asiatic side of the Bosporus. There is also a refuge house.

**Coast.**—The coast between Kara Burnu and Galara Burnu, 5½ miles westward, is fairly straight and consists of yellow cliffs, in places broken by small valleys with narrow strips of beach.

**Mariola** (*41° 13′ N., 29° 21′ E.*).—A short distance westward of Kara Burnu there is a small collection of huts named Mariola, where during the summer months a fishery is carried on, but which in the winter is deserted. Abreast the huts is a good place to beach a boat in heavy weather.

**Adarjiklar,** one of the highest of the yellow cliffs, is situated about 4 miles westward of Kara Burnu.

**Rocket station.**—Near its summit is a rocket station and refuge house. The shore is foul off the cliff.

**Galara Burnu.—Landmark.**—The next projecting point westward is long and sloping. It terminates in a rock separated from the land by a narrow passage of a few yards in width, but which rock, not being of greater elevation than the point, has not the slightest resemblance to Kara Burnu. The three faces of the point have been painted white as a distinguishing mark for approaching the Bosporus.

**Rocket station.**—A rocket station with a refuge house is established on the point.

**Khairsis Adasi—Landmark.**—Khairsis Adasi lies about 1¼ miles westward of Galara Burnu and ½ mile eastward of Elmas Tabia Burnu, and is surrounded by reefs. It should not be approached within ½ mile. The islet is high, rises abruptly from the sea, and consists of two portions connected in the center by a low ridge. The cliffs underneath the northern and larger portion have been whitened, presenting a mark seen in all directions from seaward. There is deep water between the islet and the shore, though the channel is narrow on account of foul ground extending from the islet; it is better avoided.

**Elmas Tabia Burnu** (*41° 14′ N., 29° 13′ E.*) is a bold headland, steep-to, and the termination of a range of hills that stretch away inland, forming the east side of Riva Valley, through which runs the rivulet of the same name, reaching the sea at the foot and to the westward of the headland. The ruins of a military station are on the point.

**Riva (Irva).**—The river is navigable for large boats to a considerable distance in the interior, and large quantities of charcoal and firewood are exported to Constantinople by means of it. The passage over the bar, however, being only open during the winter, the cargoes have in summer to be transshipped, which has necessitated the building of the village of Riva as a small seaport and home for the sailors engaged in this traffic.

At the mouth is an old fortified work.

**Anchorage.**—There is anchorage in 4 fathoms (7.3 m.) ½ mile westward of the village, the water shoaling quickly toward the shore.

**Lifeboat—Rocket station.**—There is a lifeboat station at the entrance to the river and a rocket station on Elmas Tabia Burnu.

**Coast.**—From the mouth of the Riva a long beach commences, which extends westward along the shore of the shallow bay, terminating in Yum Burnu, a distance of 1½ miles. This beach should not be approached within 1 mile, as the water shoals rapidly.

**Sovak,** an islet lying near the head of the bay between Riva and Yum Burnu, connected to the beach by a sandy spit, is of considerable elevation and shelters the few huts built on the shore, where a fishery is carried on during the summer months.

**Beaching.**—Near the termination of the beach, at nearly 1 mile eastward of Yum Burnu, where the Sovak Dere reaches the sea, is the best point to beach a disabled vessel unable to weather Yum Burnu.

**Yum Burnu** (*41° 13′ N., 29° 10′ E.*) is a bold headland, steep-to, and so much more elevated than the land in the vicinity that the lighthouse on Cape Anatoli is not seen when approaching the entrance to the Bosporus on a course more westerly than southwest by west. Vessels from the eastward should accordingly be careful not to alter their course to southward in thick weather or in dark nights until both lights at the Bosporus are in sight. At those times Elmas Tabia Burnu may be taken for Yum Burmu, and the vessel thereby placed in danger.

**Landmark.**—Underneath Yum Burnu the cliffs are whitewashed, showing a mark in all northerly directions for about 15 miles in clear weather; it sometimes appears double, owing to a division in the marking.

**Rocket station.**—There is a rocket station on Yum Burnu.

**Fog signal.**—The fog signal at Yum Burnu is made by a siren.

**Northern entrance to Bosporus.**—For description see page 164.

# APPENDIX I

*Particulars of dry docks, marine railways, etc.*

| Port | Name of dock | Length | | Breadth of entrance | Depth at C. D. L.[1] | | Springs rise | Lifting power | Date built | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | On blocks | Over all | | On sill | On blocks | | | | |
| | | *Feet* | *Feet* | *Feet* | *Feet* | *Feet* | *Feet* | *Tons* | | |
| Constantinople | Government No. 1 | 344 | 356 | 72 | 32 | 31 | | | | |
| | | 370 | 382 | Caisson in outer stop. | | | | | | |
| | Government No. 2 | 253 | 256 | 57 | 26 | 25 | | | | |
| | | 280 | 283 | Caisson in outer stop. | | | | | | |
| | Government Nos. 3 and 4, inner. | 242 | 256 | 64 | 26 | 22 | | | | |
| | Government Nos. 3 and 4, outer. | 230 | 230 | 62 | 26 | 24 | | | | |
| | | 262 | 262 | Caisson in outer stop. | | | | | | |
| | Government floating | | 250 | 49 | 17 | 19 | | 1,500 | 1874 | |
| | Marine railway (Government). | 120 (cradle) | | | | | | 500 | | |
| | Chiukit i Hairi | 176 (cradle) | | | Forward.<br>Aft. | 6<br>7 | | 670 | | |
| | Buyukdere | 154 (cradle) | | | Forward.<br>Aft. | 10<br>11 | | 450 | | |
| | Topkhana | 112 (cradle) | | | Forward.<br>Aft. | 10<br>15 | | 300 | | |
| | Fundukli | 190 (cradle) | | | Forward.<br>Aft. | 10<br>11 | | 480 | | |
| Istenie | Floating | | 450 | 70 | | | | 8,500 | 1913 | |
| Constantsa | Marine railway | | | | | | | 1,000 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Galatz | Government Floating | | 264⅓ | 55⅔ | | 16½ | | 2,200 | 1898 | In two sections. |
| | Government Floating | | 147 1/12 | 49⅙ | | 10¾ | | 400 | 1898 | |
| Odessa | Floating | | 385 | 60 | 23½ | 20 | | 4,800 | 1901 | In two parts. |
| | Marine railway, Bellino Fenderich. | 210 (cradle). | | | | 9 | | 1,000 | | Vessels are hauled up broadside on. |
| | Marine railway, R. S. N. Co. | 203 (cradle). | | | | 9 | | 700 | | |
| Kherson | Floating dock | | | | | | | 2,000 | | Will take a vessel 195 feet long. There are a number of slips for repairing and cleaning small craft. |
| Nikolaev | do | 558 | | 136 | | 30 | | 30,000 | 1916 | In five sections. |
| | Marine railway (Government). | 180 (cradle). | | | Forward.<br>Aft. | 5¼<br>21½ | | 1,200 | | |
| Sevastopol | Alexievsky | 487½ | | 85 | 27 | | | | 1886 | |
| | Alexandrovsky | 555 | | 85 | 30 | | | | 1898 | |
| | New No. 1 | 750 | 765 | 130⅔ | 35½ | | | | 1916 | In Panaistova Creek. |
| | Floating | | 280 | 70 | | | | 5,600 | | In three sections. |
| | do | | 656¾ | 136 | 34 | 30 | | 30,000 | | Building. |
| | Marine railway (Government). | 80 (cradle). | | | Aft. | 18 | | 500 | | |
| | Marine railway, R. S. N. Co. | 250 (cradle). | | | | 23 | | 1,200 | | Will take up two vessels of 1,200 tons each. |
| Mariupol (R. Kalmius) | Floating | | 173½ | 45 11/12 | 19 11/12 | 16 11/12 | | 2,000 | | Will take a vessel 190 feet long of 18 feet draft. |
| Rostov-on-Don | Marine railway (Olchi-Oglou). | 180 (cradle). | | | | | | 400 | | Takes up five vessels each 180 feet in length. |
| | Marine railway (Feotani) | 200 (cradle). | | | Forward.<br>Aft. | 1½<br>7 | | 700 | | |
| Taganrog | Marine railway | 100 (cradle). | | | | | | 300 | | |
| Novorossisk | Floating dock | | 190 | 46 | | | | 2,000 | 1919 | |

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[1] C. d. l.=chart datum level.

# APPENDIX II

*List of principal ports, showing particulars of depths, etc.*

| Port | Depth at C. d. l.[1] in channel of approach | Depth at C. d. l.[1] in anchorage | Remarks |
|---|---|---|---|
| **Batum** | Deep approach | 17 to 30 fathoms | Vessels secure their sterns to the shore. 4 to 4½ fathoms in petroleum harbor. |
| **Burgas** | do | 6 to 6½ fathoms | Open to the eastward. 24 feet in harbor. |
| Constantinople | do | 6 to 8 fathoms | Between Fanar Bank and Leander Tower. Good holding ground. Buoys in harbor. |
| | | 15 to 20 fathoms | Off Topkhana. |
| Constantsa | do | 7 to 8 fathoms | Open to the eastward. 24 to 30 feet in harbor. |
| Kherson | 21 feet | | Vessels up to 21 feet draft can reach Kherson. Vessels berth at piers. |
| Mariupol | 24 feet | 24 to 25 feet | 24 feet in harbor. |
| Nikolaev | 26 feet | 30 feet | Channel of approach dredged to 30 feet, but since silted. |
| Novorossisk | Deep approach | 6 fathoms (in harbor); 7 to 10 fathoms (outside harbor). | Anchorage dangerous during autumn and winter months. 20 to 28 feet at various piers. |
| Odessa | do | 6 to 9 fathoms | Open to south and southeast. 26 feet in new harbor; 16 to 30 feet in other harbors. |
| Poti | do | 10 to 12 fathoms | Open anchorage. 25 to 27 feet in harbors. |
| Sevastopol | do | 6 to 9 fathoms | Good holding ground. |
| Sinūb (Sinope) | do | 5 to 10 fathoms | Open only from east to south. The safest anchorage between Batum and the Bosporus. |
| Sulina (Danube entrance). | 21 feet | 7 to 8 fathoms | Open anchorage. Channel dredged to 24 feet but since silted. |
| Taganrog | 12 feet | 20 to 25 feet (in roads). | Good holding ground. |
| Theodosia | Deep approach | 8 fathoms | Open to eastward. 24 feet in harbor. |
| Trebizond | do | 5 fathoms | Open to all northerly winds. Good holding ground. |
| Varna | do | 7 to 8 fathoms | Open to eastward. 23 feet in harbor. |

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[1] C. d. l.—chart datum level.

# APPENDIX III

## METEOROLOGICAL TABLES

[From the British Admiralty Sailing Directions]

*Place—Constantinople. Obs.* △ *Lat. 41° 02′ N., long. 28° 58′ E. Height above M. S. L., 246 feet (75 m.)*

[Meteorological table compiled from 1 to 48 years' observations (1846–1895)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.10 | 0.03 | 30.71 | 29.26 | 1.45 | 41 | 46 | 38 | 8 | 65 | 17 | 48 | 79 | .... | 3.43 | 10 | 1.30 | .... | 9 | 7 | 0 | 2 | 4 | 6 | 0 | 3 | 0 | 0.9 | 4 |
| February | 30.09 | .03 | 30.68 | 29.18 | 1.51 | 41 | 45 | 36 | 9 | 71 | 19 | 52 | 77 | .... | 2.72 | 8 | 1.39 | .... | 8 | 9 | 0 | 2 | 3 | 5 | 0 | 1 | 0 | .5 | 4 |
| March | 29.98 | .04 | 30.59 | 29.15 | 1.45 | 46 | 52 | 40 | 12 | 78 | 18 | 60 | 71 | .... | 2.44 | 9 | 1.81 | .... | 8 | 10 | 0 | 1 | 6 | 4 | 0 | 2 | 0 | .4 | 5 |
| April | 29.95 | .04 | 30.53 | 23.38 | 1.15 | 53 | 60 | 46 | 14 | 83 | 32 | 51 | 66 | .... | 1.65 | 7 | 1.20 | .... | 6 | 9 | 0 | 1 | 6 | 6 | 0 | 2 | 0 | .2 | 1 |
| May | 29.95 | .03 | 30.27 | 29.44 | .83 | 62 | 71 | 55 | 16 | 90 | 39 | 51 | 64 | .... | 1.18 | 7 | 1.40 | .... | 6 | 12 | 0 | 1 | 7 | 4 | 0 | 1 | 0 | .2 | 1 |
| June | 29.93 | .03 | 30.33 | 29.50 | .83 | 70 | 78 | 62 | 16 | 94 | 49 | 45 | 60 | .... | 1.34 | 5 | 1.62 | .... | 5 | 14 | 0 | 1 | 5 | 3 | 0 | 2 | 0 | .2 | 1 |
| July | 29.89 | .02 | 30.24 | 29.41 | .83 | 74 | 82 | 67 | 15 | 100 | 55 | 45 | 60 | .... | 1.06 | 3 | 1.91 | .... | 6 | 18 | 0 | 0 | 3 | 2 | 0 | 2 | 0 | .4 | 1 |
| August | 29.92 | .03 | 30,24 | 29.47 | .77 | 75 | 82 | 68 | 14 | 99 | 52 | 47 | 61 | .... | 1.65 | 4 | 6.30 | .... | 6 | 18 | 0 | 0 | 3 | 2 | 0 | 2 | 0 | .3 | 1 |
| September | 30.00 | .02 | 30.36 | 29.47 | .89 | 68 | 75 | 62 | 13 | 95 | 42 | 53 | 65 | .... | 2.05 | 6 | 2.26 | .... | 6 | 13 | 0 | 1 | 3 | 3 | 0 | 4 | 0 | .4 | 3 |
| October | 30.06 | .03 | 30.53 | 29.47 | 1.06 | 62 | 68 | 57 | 11 | 89 | 39 | 50 | 71 | .... | 2.52 | 7 | 2.41 | .... | 6 | 12 | 0 | 0 | 5 | 6 | | 2 | 0 | .1 | 6 |
| November | 30.07 | .03 | 30.71 | 28.97 | 1.74 | 53 | 58 | 49 | 9 | 80 | 35 | 45 | 76 | .... | 4.02 | 11 | 2.17 | .... | 5 | 6 | 0 | 2 | 6 | 9 | 0 | 2 | 0 | .3 | 5 |
| December | 30.07 | .03 | 30.83 | 29.29 | 1.54 | 46 | 51 | 43 | 8 | 69 | 20 | 49 | 73 | .... | 4.80 | 12 | 2.56 | .... | 6 | 6 | 1 | 2 | 3 | 11 | 0 | 2 | 0 | .6 | 4 |
| Mean | 30.00 | 0.3 | | | | 58 | 64 | 52 | 12 | | | | 69 | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 28.86 | 89 | | | 77 | 134 | 1 | 13 | 54 | 61 | 0 | 25 | 0 | 4.5 | 36 |
| Extreme values | | | 30.83 | 28.97 | 1.86 | | | | | 100 | 17 | 83 | | | | | 6.30 | | | | | | | | | | | | |
| Number of years' observations | 40 | 1 | 28 | | | 47 | 15 | | | 28 | | | | .... | 48 | 28 | 12 | .... | 8 | | | | | | | | | 13 | 28 |

Pressure, temperature, and humidity refer to "true mean" values.

Authorities: Buchan, A., *Challenger* report on atmospheric circulation.
Constantinople, Observatoire Impériale, Bulletin Meteorologique et Sismique.

*Place—Varna. Obs.* ◬ *Lat. 43° 12′ N., long. 27° 55′ E. Height above M. S. L., 115 feet (35.1 m.)*

[Meteorological table compiled from 8 to 15 years' observations (1869-1874, 1900-1915)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *° F.* | *° F.* | *° F.* | *° F.* | *° F.* | *° F.* | *° F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.17 | ...... | 31.37 | 29.29 | 1.98 | 33 | 40 | 26 | 14 | 65 | −3 | 68 | 79 | 6 | 1.38 | 9 | 1.14 | 3.4 | 4 | 3 | 3 | 1 | 1 | 2 | 7 | 6 | 4 | 2.5 | 2.8 |
| February | 30.05 | ...... | 29.83 | 29.35 | 1.36 | 37 | 45 | 32 | 13 | 74 | +6 | 68 | 79 | 7 | 1.15 | 9 | 1.74 | 3.1 | 4 | 3 | 5 | 2 | 1 | 2 | 4 | 3 | 4 | 1.7 | 4.4 |
| March | 30.02 | ...... | 30.62 | 29.23 | 1.39 | 42 | 48 | 35 | 13 | 74 | 16 | 58 | 78 | 7 | 1.07 | 8 | .93 | 2.9 | 4 | 4 | 6 | 3 | 1 | 1 | 4 | 4 | 4 | 1.0 | 4.6 |
| April | 29.97 | ...... | 30.50 | 29.35 | 1.15 | 50 | 58 | 43 | 15 | 91 | 29 | 62 | 73 | 6 | 1.47 | 9 | 1.31 | 2.7 | 4 | 3 | 8 | 3 | 1 | 1 | 4 | 2 | 4 | 1.5 | 2.5 |
| May | 29.98 | ...... | 30.36 | 29.32 | 1.03 | 60 | 69 | 52 | 17 | 96 | 34 | 62 | 75 | 5 | 1.64 | 9 | 1.54 | 2.4 | 2 | 2 | 8 | 4 | 1 | 2 | 5 | 2 | 5 | .5 | 1.1 |
| June | 29.91 | ...... | 30.27 | 29.47 | .80 | 68 | 77 | 59 | 18 | 91 | 46 | 45 | 77 | 5 | 3.09 | 11 | 1.58 | 2.3 | 2 | 2 | 6 | 3 | 1 | 2 | 6 | 3 | 5 | .7 | .5 |
| July | 29.92 | ...... | 30.33 | 29.56 | .77 | 72 | 83 | 63 | 20 | 96 | 51 | 45 | 72 | 3 | 1.80 | 7 | 3.87 | 2.6 | 3 | 2 | 4 | 4 | 1 | 2 | 6 | 3 | 6 | 1.1 | .5 |
| August | 29.96 | ...... | 30.33 | 29.56 | .77 | 72 | 84 | 62 | 22 | 103 | 50 | 53 | 70 | 2 | 1.47 | 4 | 2.92 | 2.5 | 3 | 2 | 5 | 4 | 1 | 2 | 5 | 3 | 6 | .8 | .9 |
| September | 30.07 | ...... | 30.50 | 29.68 | .83 | 64 | 77 | 56 | 21 | 92 | 34 | 58 | 72 | 4 | 1.48 | 5 | 3.54 | 3.0 | 4 | 3 | 4 | 4 | 1 | 1 | 5 | 4 | 4 | .3 | 2.5 |
| October | 30.10 | ...... | 30.59 | 29.44 | 1.15 | 56 | 67 | 50 | 17 | 89 | 27 | 62 | 78 | 6 | 2.00 | 7 | 2.23 | 3.1 | 5 | 3 | 4 | 3 | 1 | 2 | 5 | 4 | 4 | 1.0 | 3.6 |
| November | 30.08 | ...... | 30.74 | 29.18 | 1.56 | 46 | 54 | 39 | 15 | 76 | 13 | 63 | 78 | 7 | 2.00 | 8 | 2.58 | 3.2 | 5 | 4 | 3 | 2 | 1 | 1 | 6 | 5 | 3 | 1.4 | 3.4 |
| December | 30.08 | ...... | 30.65 | 29.15 | 1.51 | 40 | 46 | 34 | 12 | 70 | 8 | 62 | 82 | 7 | 1.45 | 9 | 1.34 | 3.3 | 4 | 2 | 3 | 2 | 1 | 2 | 7 | 7 | 3 | 2.2 | 4.2 |
| Means | 30.02 | | | | | 53 | 62 | 46 | 16 | | | | 76 | 5 | | | | 2.9 | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 20.00 | 95 | | | 44 | 33 | 59 | 35 | 12 | 20 | 64 | 46 | 52 | 147 | 31.0 |
| Extreme values | | | 31.37 | 29.15 | 2.13 | | | | | 103 | −3 | 106 | | | | | 3.87 | | | | | | | | | | | | |
| Number of years observations | 11 | ...... | 11 | | | 15 | 11 | | | 15 | | | | 11 | 15 | | | 8 | 14 | | | | | | | | | 11 | |

Hours of observation, 7 a. m., 2 p. m., 9 p. m.
Authorities: Constantinople, Observatoire Imperiale, Bulletin Meterologique et Sismique.
Sofia, Institut Meteorologique de Bulgarie, Annuaire 1900–1910, Bulletin Mensuel 1911–1915.

*Place—Braila. Obs.* △ *Lat. 45° 16′ N., long. 27° 58′ E. Height above M. S. L., 82 feet (25 m.)*

[Meteorological table compiled from 14 to 26 years' observations (1879–1910)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.15 | ...... | 30.80 | 29.23 | 1.56 | 24 | 31 | 18 | 13 | 56 | −15 | 71 | 88 | 7 | 1.26 | 8 | 2.25 | ...... | 6 | 5 | 2 | 3 | 3 | 3 | 2 | 3 | 4 | 4.1 | 6.6 |
| February | 30.06 | ...... | 30.74 | 29.00 | 1.74 | 30 | 36 | 23 | 13 | 64 | −5 | 69 | 86 | 7 | .98 | 5 | .89 | ...... | 5 | 5 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 2.4 | 5.3 |
| March | 29.99 | ...... | 30.68 | 29.26 | 1.42 | 40 | 48 | 32 | 16 | 79 | +2 | 77 | 84 | 6 | 1.35 | 7 | 3.78 | ...... | 5 | 5 | 3 | 5 | 4 | 3 | 2 | 2 | 2 | 3.5 | 3.2 |
| April | 29.94 | ...... | 30.47 | 29.15 | 1.33 | 52 | 61 | 43 | 18 | 84 | 25 | 59 | 77 | 6 | 1.37 | 8 | 1.37 | ...... | 4 | 5 | 4 | 5 | 4 | 3 | 1 | 2 | 2 | 4.1 | 1.1 |
| May | 29.94 | ...... | 30.39 | 29.35 | 1.03 | 62 | 72 | 53 | 19 | 94 | 36 | 58 | 75 | 5 | 1.79 | 9 | 1.12 | ...... | 4 | 4 | 4 | 5 | 3 | 3 | 2 | 3 | 3 | 3.7 | .5 |
| June | 29.91 | ...... | 30.33 | 29.47 | .86 | 69 | 79 | 60 | 19 | 95 | 41 | 54 | 72 | 5 | 2.80 | 9 | 3.37 | ...... | 3 | 3 | 3 | 6 | 4 | 3 | 2 | 3 | 3 | 3.7 | .1 |
| July | 29.90 | ...... | 30.21 | 29.44 | .77 | 74 | 84 | 63 | 21 | 99 | 48 | 51 | 71 | 4 | 1.99 | 7 | 2.90 | ...... | 4 | 3 | 2 | 5 | 4 | 3 | 2 | 4 | 4 | 4.0 | .1 |
| August | 29.95 | ...... | 30.30 | 29.53 | .77 | 72 | 84 | 61 | 23 | 102 | 39 | 63 | 71 | 3 | 1.12 | 5 | 1.95 | ...... | 4 | 3 | 3 | 5 | 3 | 2 | 2 | 3 | 6 | 4.2 | .6 |
| September | 30.05 | ...... | 30.50 | 29.53 | .97 | 63 | 74 | 52 | 22 | 95 | 30 | 65 | 75 | 4 | 1.38 | 5 | 1.48 | ...... | 3 | 5 | 3 | 4 | 3 | 2 | 1 | 3 | 6 | 3.5 | 1.7 |
| October | 30.05 | ...... | 30.68 | 29.47 | 1.21 | 55 | 64 | 46 | 18 | 91 | 24 | 67 | 82 | 5 | 1.46 | 6 | 1.10 | ...... | 3 | 4 | 3 | 5 | 4 | 4 | 1 | 3 | 4 | 3.3 | 4.6 |
| November | 30.16 | ...... | 29.92 | 29.97 | 1.65 | 41 | 47 | 34 | 13 | 72 | +3 | 69 | 84 | 6 | 1.19 | 7 | 2.31 | ...... | 4 | 4 | 2 | 3 | 4 | 4 | 1 | 3 | 5 | 2.9 | 6.9 |
| December | 30.16 | ...... | 31.01 | 29.26 | 1.74 | 30 | 35 | 24 | 11 | 59 | −5 | 64 | 88 | 7 | 1.20 | 9 | 1.04 | ...... | 4 | 6 | 2 | 3 | 4 | 4 | 2 | 3 | 3 | 2.5 | 8.4 |
| Means | 30.02 | ...... | | | | 51 | 60 | 42 | 18 | | | | 79 | 5 | | | | ...... | | | | | | | | | | | |
| Total | | ...... | | | | | | | | | | | | | 17.89 | 85 | | ...... | 49 | 52 | 33 | 52 | 43 | 37 | 20 | 34 | 45 | 41.9 | 39.1 |
| Extreme values | | ...... | 31.01 | 29.00 | 2.01 | | | | | 102 | −15 | 117 | | | | | 3.78 | ...... | | | | | | | | | | | — |
| Number of years observations | 26 | ...... | 14 | | | 20 | | | | | | | | 14 | 32 | 20 | | ...... | 14 | | | | | | | | | 20 | 14 |

Authorities: S. C. Hepiks, Album Climatologigue de Roumanie.
Annales de l' Institut Meteorologiquede de Roumanie

*Place—Odessa.* *Obs.* △ *Lat. 46° 29′ N., long. 30° 46′ E.* *Height above M. S. L., 214 feet (65.2 m.)*

[Meteorological table compiled from 13 to 48 years' observations (1866–1913)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° |  |  |  |  | Air temperature |  |  |  |  |  |  | Relative humidity | Cloud amount. Scale 0 to 10 | Rain |  |  | Wind |  |  |  |  |  |  |  |  |  | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Mean |  | Extreme |  |  | Mean |  |  |  | Extreme |  |  |  |  |  |  |  | Mean force, Beaufort scale | Number of days from— |  |  |  |  |  |  |  |  |  |  |
|  | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range |  |  | Total fall | Number of days | Maximum fall in 24 hours |  | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm |  |  |
|  | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | *P. ct.* |  | *Ins.* |  | *Ins.* |  |  |  |  |  |  |  |  |  |  |  |  |
| January | 30.16 | ...... | 31.24 | 29.03 | 2.21 | 26 | 36 | 15 | 21 | 55 | −10 | 65 | 88 | 8 | 0.94 | 9 | 0.84 | 3.8 | 6 | 5 | 3 | 2 | 2 | 4 | 3 | 4 | 2 | 3.2 | 6 |
| February | 30.10 | ...... | 30.92 | 29.03 | 1.89 | 28 | 37 | 19 | 18 | 65 | −19 | 84 | 84 | 7 | .84 | 8 | .66 | 3.8 | 5 | 5 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3.1 | 6 |
| March | 30.02 | ...... | 30.89 | 29.00 | 1.89 | 36 | 45 | 26 | 19 | 71 | 0 | 71 | 82 | 7 | 1.14 | 9 | 1.00 | 3.7 | 5 | 5 | 4 | 3 | 4 | 3 | 2 | 3 | 2 | 2.1 | 7 |
| April | 29.98 | ...... | 30.56 | 29.23 | 1.33 | 48 | 56 | 39 | 17 | 86 | +25 | 61 | 73 | 6 | 1.03 | 7 | 1.37 | 3.6 | 4 | 3 | 4 | 4 | 5 | 3 | 2 | 2 | 3 | 1.5 | 3 |
| May | 29.96 | ...... | 30.44 | 29.38 | 1.06 | 61 | 70 | 51 | 19 | 94 | 33 | 61 | 68 | 5 | 1.26 | 8 | .97 | 3.2 | 4 | 3 | 3 | 4 | 5 | 4 | 2 | 3 | 3 | .5 | 2 |
| June | 29.91 | ...... | 30.39 | 29.35 | 1.03 | 68 | 77 | 59 | 18 | 93 | 42 | 51 | 66 | 5 | 2.13 | 9 | 3.11 | 3.2 | 5 | 3 | 2 | 3 | 5 | 3 | 3 | 3 | 3 | .3 | 0 |
| July | 29.90 | ...... | 30.36 | 29.20 | 1.15 | 73 | 81 | 64 | 17 | 95 | 50 | 45 | 62 | 4 | 1.70 | 7 | 2.99 | 3.1 | 6 | 3 | 2 | 2 | 4 | 3 | 3 | 5 | 3 | .3 | 1 |
| August | 29.95 | ...... | 30.36 | 29.41 | .94 | 71 | 80 | 63 | 17 | 95 | 46 | 49 | 61 | 3 | 1.21 | 5 | 1.88 | 3.1 | 5 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | .5 | 1 |
| September | 30.03 | ...... | 30.59 | 29.50 | 1.09 | 62 | 72 | 53 | 19 | 90 | 31 | 59 | 67 | 4 | 1.13 | 5 | 1.60 | 3.3 | 5 | 3 | 3 | 3 | 4 | 2 | 3 | 3 | 4 | .3 | 2 |
| October | 30.11 | ...... | 30.71 | 29.38 | 1.33 | 52 | 62 | 42 | 20 | 86 | 14 | 72 | 77 | 6 | 1.33 | 6 | 2.11 | 3.5 | 4 | 5 | 4 | 3 | 4 | 3 | 2 | 3 | 3 | 1.8 | 5 |
| November | 30.11 | ...... | 30.80 | 29.15 | 1.65 | 41 | 50 | 31 | 19 | 73 | 6 | 67 | 83 | 7 | 1.25 | 8 | 1.08 | 3.7 | 5 | 4 | 4 | 2 | 4 | 3 | 2 | 3 | 3 | 1.9 | 5 |
| December | 30.13 | ...... | 30.98 | 29.03 | 1.95 | 31 | 42 | 20 | 22 | 60 | −7 | 67 | 87 | 8 | 1.28 | 10 | .73 | 3.8 | 5 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 2.6 | 7 |
| Means | 30.03 | ...... |  |  |  | 50 | 59 | 40 | 19 |  |  |  | 75 | 6 |  |  |  | 3.5 |  |  |  |  |  |  |  |  |  |  |  |
| Total |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15.24 | 91 |  |  | 59 | 46 | 39 | 33 | 46 | 38 | 31 | 39 | 34 | 18.1 | 45 |
| Extreme values |  |  | 31.24 | 29.00 | 2.24 |  |  |  |  | 95 | −19 | 114 |  |  |  |  | 3.11 |  |  |  |  |  |  |  |  |  |  |  |  |
| Number of years' observations | 48 | ...... | 47 |  |  | 43 |  |  |  | 46 |  |  | 47 |  |  | 46 | 20 |  | 47 |  |  |  |  |  |  |  |  | 13 | 47 |

Based on observations at 7 a. m., 2 p. m., 9 p. m.
Authorities: Annales de l'Observatoire á Odessa.
Klossovsky, Le Climat d'Odessa.

*Place—Nikolaev. Obs.* △ *Lat. 46° 58′ N., long. 31° 58′ E. Height above M. S. L., 64 feet (19.5 m.)*

[Meteorological table compiled from 14 to 85 years' observations (1824-1908)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | Mean force, Beaufort scale | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.15 | | 30.21 | 29.12 | 2.10 | 24 | | 19 | | 54 | −22 | 76 | 87 | 7 | 0.71 | 7 | 1.00 | 3.1 | 4 | 5 | 2 | 2 | 3 | 3 | 2 | 3 | 7 | 2 | 5 |
| February | 30.10 | | 30.95 | 29.06 | 1.89 | 27 | | 24 | | 61 | −21 | 82 | 86 | 7 | .77 | 6 | .87 | 3.2 | 3 | 6 | 3 | 2 | 3 | 2 | 2 | 2 | 5 | 2 | 5 |
| March | 30.01 | | 30.89 | 28.97 | 1.92 | 36 | | 31 | | 69 | −6 | 75 | 83 | 7 | .98 | 8 | 1.05 | 3.3 | 3 | 6 | 2 | 3 | 5 | 2 | 1 | 3 | 6 | 3 | 4 |
| April | 29.98 | | 30.59 | 29.20 | 1.39 | 48 | | 40 | | 83 | 21 | 62 | 73 | 5 | 1.00 | 7 | 1.30 | 3.2 | 3 | 5 | 3 | 2 | 5 | 3 | 1 | 2 | 6 | 2 | 2 |
| May | 29.96 | | 30.44 | 29.47 | .97 | 62 | | 52 | | 100 | 34 | 66 | 69 | 4 | 1.47 | 8 | 1.58 | 2.7 | 3 | 4 | 3 | 2 | 5 | 3 | 1 | 2 | 8 | 2 | 0.6 |
| June | 29.91 | | 30.36 | 29.32 | 1.03 | 69 | | 60 | | 100 | 41 | 59 | 68 | 4 | 2.32 | 8 | 2.21 | 2.6 | 4 | 3 | 1 | 1 | 4 | 3 | 2 | 4 | 8 | 1 | .3 |
| July | 29.89 | | 30.42 | 29.12 | 1.30 | 74 | | 63 | | 102 | 49 | 53 | 64 | 3 | 1.79 | 7 | 2.34 | 2.5 | 4 | 3 | 1 | 1 | 3 | 3 | 2 | 5 | 9 | 1 | .0 |
| August | 29.94 | | 30.39 | 29.29 | 1.09 | 72 | | 61 | | 103 | 47 | 56 | 62 | 3 | 1.15 | 5 | 2.69 | 2.5 | 5 | 4 | 1 | 1 | 3 | 2 | 2 | 4 | 9 | 1 | .2 |
| September | 30.05 | | 30.53 | 29.47 | 1.06 | 63 | | 52 | | 99 | 28 | 71 | 70 | 3 | 1.03 | 4 | 1.45 | 2.6 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 4 | 9 | 1 | 1 |
| October | 30.10 | | 30.77 | 29.38 | 1.39 | 51 | | 43 | | 83 | 18 | 65 | 80 | 5 | 1.20 | 6 | 1.71 | 2.8 | 3 | 5 | 2 | 2 | 4 | 2 | 1 | 3 | 9 | 2 | 4 |
| November | 30.13 | | 30.86 | 29.15 | 1.71 | 39 | | 32 | | 70 | −6 | 76 | 86 | 7 | 1.04 | 7 | 1.54 | 2.9 | 3 | 4 | 3 | 3 | 4 | 2 | 1 | 3 | 7 | 2 | 6 |
| December | 30.10 | | 30.01 | 29.03 | 1.98 | 30 | | 25 | | 59 | −16 | 75 | 88 | 7 | 1.08 | 8 | 1.31 | 3.0 | 4 | 6 | 2 | 2 | 3 | 3 | 2 | 2 | 7 | 2 | 6 |
| Means | 30.03 | | | | | 50 | | 42 | | | | | 76 | 5 | | | | 2.9 | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 14.54 | 81 | | | 42 | 55 | 25 | 23 | 45 | 30 | 18 | 37 | 90 | 21 | 34 |
| Extreme values | | | 31.21 | 28.97 | 2.24 | | | | | 103 | −22 | 125 | | | | | 2.69 | | | | | | | | | | | | |
| Number of years' observations | 39 | | 39 | | | 85 | | 18 | | 78 | | | 32 | 39 | 51 | | | 32 | 39 | | | | | | | | | | 14 |

Based on observations at 7 a. m., 2 p. m., 9 p. m.
Authority: Annales de l'Observatoire Physique Central Nicolas, Petrograd.

*Place—Sevastopol. Obs.* ⚠ *Lat. 44° 37′ N., long. 33° 31′ E. Height above M. S. L., 76 feet (23.2 m.)*

[Meteorological table compiled from 10 to 39 years' observations (1870–1908)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.10 | | 31.12 | 29.38 | 1.74 | 36 | | 30 | | 66 | −4 | 70 | 80 | 7 | 1.17 | 9 | 0.78 | 2.6 | 3 | 7 | 3 | 2 | 3 | 3 | 2 | 2 | 6 | 2.0 | 1.0 |
| February | 30.04 | | 30.74 | 29.26 | 1.48 | 37 | | 32 | | 72 | +1 | 71 | 80 | 7 | 1.13 | 10 | 1.02 | 2.5 | 3 | 6 | 2 | 2 | 3 | 2 | 2 | 3 | 5 | 1.4 | 1.2 |
| March | 29.98 | | 30.59 | 29.32 | 1.27 | 42 | | 36 | | 80 | 4 | 76 | 75 | 7 | 1.30 | 9 | 1.11 | 2.5 | 3 | 5 | 3 | 2 | 3 | 3 | 2 | 3 | 7 | 1.9 | 1.3 |
| April | 29.94 | | 30.47 | 29.29 | 1.18 | 50 | | 42 | | 84 | 26 | 58 | 71 | 5 | 1.11 | 7 | 2.08 | 2.3 | 1 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 8 | 1.4 | 1.3 |
| May | 29.93 | | 30.30 | 29.56 | .74 | 61 | | 52 | | 90 | 38 | 52 | 71 | 4 | .74 | 6 | .91 | 2.0 | 2 | 2 | 3 | 2 | 3 | 4 | 3 | 3 | 9 | .8 | .4 |
| June | 29.89 | | 30.30 | 29.35 | .94 | 69 | | 60 | | 93 | 41 | 52 | 70 | 4 | 1.15 | 5 | 1.89 | 2.1 | 1 | 2 | 3 | 2 | 3 | 3 | 4 | 4 | 8 | .7 | .1 |
| July | 29.87 | | 30.27 | 29.12 | 1.15 | 74 | | 65 | | 97 | 54 | 43 | 67 | 3 | 1.10 | 4 | 4.65 | 2.2 | 1 | 2 | 4 | 1 | 2 | 3 | 4 | 5 | 9 | 1.1 | 0 |
| August | 29.91 | | 30.30 | 29.56 | .74 | 73 | | 64 | | 98 | 52 | 46 | 66 | 2 | .87 | 4 | 2.21 | 2.3 | 2 | 4 | 5 | 1 | 1 | 2 | 3 | 5 | 8 | 1.3 | 0 |
| September | 30.00 | | 30.47 | 29.53 | .94 | 65 | | 57 | | 94 | 36 | 58 | 68 | 3 | 1.17 | 5 | 1.37 | 2.4 | 2 | 4 | 5 | 2 | 2 | 2 | 2 | 4 | 7 | 1.5 | 0 |
| October | 30.06 | | 30.59 | 29.50 | 1.09 | 57 | | 50 | | 89 | 27 | 62 | 76 | 4 | 1.43 | 6 | 1.71 | 2.2 | 2 | 4 | 5 | 3 | 3 | 2 | 2 | 3 | 7 | 1.6 | .3 |
| November | 30.09 | | 30.83 | 29.38 | 1.45 | 47 | | 39 | | 77 | +10 | 67 | 78 | 6 | 1.47 | 8 | 1.81 | 2.4 | 3 | 6 | 4 | 3 | 3 | 2 | 2 | 2 | 5 | 1.5 | 1.1 |
| December | 30.11 | | 30.77 | 29.26 | 1.51 | 41 | | 35 | | 68 | −6 | 74 | 80 | 7 | 1.45 | 10 | 1.02 | 2.4 | 2 | 6 | 3 | 3 | 4 | 3 | 2 | 2 | 6 | 2.1 | 1.1 |
| Means | 30.00 | | | | | 54 | | 47 | | | | | 74 | 5 | | | | 2.3 | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 14.09 | 83 | | | 25 | 51 | 43 | 25 | 34 | 32 | 31 | 39 | 85 | 17.3 | 7.8 |
| Extreme values | | | 31.12 | 29.12 | 2.01 | | | | | 98 | −6 | 104 | | | | | 4.65 | | | | | | | | | | | | |
| Number of years' observations | 33 | | 24 | | | 39 | | 18 | | 30 | | | 15 | 30 | | | | 24 | 39 | | | | | | | | | 29 | 1 |

Based on observations at 7 a. m., 2 p. m., 9 p. m.
Authority: Annales de l'Observatoire Physique Central Nicholas, Petrograd.

*Place—Kertch. Obs.* ⚠ *Lat. 45° 21′ N., long. 36° 29′ E. Height above M. S. L., 12 feet (3.7 m.)*

[Meteorological table compiled from 7 to 35 years' observations (1874-1913)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.12 | ---- | 31.04 | 29.26 | 1.77 | 30 | ---- | 26 | ---- | 59 | −1 | 60 | 89 | 8 | 0.80 | 8 | 0.97 | 3.0 | 3 | 5 | 5 | 2 | 2 | 2 | 2 | 5 | 5 | 1.4 | 4.1 |
| February | 30.09 | ---- | 30.86 | 29.09 | 1.77 | 32 | ---- | 29 | ---- | 58 | −12 | 70 | 88 | 7 | .79 | 7 | .63 | 3.0 | 3 | 3 | 5 | 2 | 2 | 2 | 2 | 4 | 5 | 1.4 | 4.8 |
| March | 30.01 | ---- | 30.71 | 29.12 | 1.59 | 38 | ---- | 33 | ---- | 68 | +2 | 66 | 84 | 7 | .85 | 8 | .93 | 3.0 | 3 | 4 | 4 | 3 | 4 | 2 | 2 | 4 | 5 | 1.8 | 5.7 |
| April | 29.98 | ---- | 30.53 | 29.41 | 1.12 | 48 | ---- | 42 | ---- | 75 | 28 | 47 | 78 | 6 | 1.02 | 8 | 2.00 | 3.0 | 2 | 4 | 4 | 3 | 5 | 2 | 2 | 3 | 5 | 1.3 | 2.1 |
| May | 29.96 | ---- | 30.33 | 29.32 | 1.00 | 61 | ---- | 54 | ---- | 82 | 40 | 42 | 76 | 5 | .99 | 6 | 1.40 | 2.8 | 3 | 3 | 3 | 3 | 6 | 3 | 2 | 3 | 5 | 1.1 | .9 |
| June | 29.89 | ---- | 30.30 | 29.47 | .83 | 70 | ---- | 62 | ---- | 89 | 44 | 45 | 73 | 4 | 2.15 | 7 | 2.43 | 2.7 | 3 | 3 | 2 | 2 | 5 | 3 | 3 | 3 | 6 | .5 | .3 |
| July | 29.86 | ---- | 30.30 | 29.23 | 1.06 | 76 | ---- | 66 | ---- | 93 | 50 | 43 | 67 | 3 | 1.63 | 5 | 3.21 | 2.6 | 4 | 4 | 2 | 2 | 3 | 2 | 3 | 5 | 6 | .5 | .4 |
| August | 29.90 | ---- | 30.33 | 29.53 | .80 | 74 | ---- | 65 | ---- | 92 | 52 | 40 | 68 | 3 | 1.28 | 4 | 2.42 | 2.9 | 4 | 6 | 3 | 2 | 2 | 2 | 3 | 4 | 5 | 1.5 | .5 |
| September | 30.01 | ---- | 30.47 | 29.56 | .91 | 65 | ---- | 56 | ---- | 88 | 34 | 54 | 73 | 4 | 1.11 | 5 | 2.64 | 2.8 | 4 | 5 | 4 | 2 | 2 | 1 | 3 | 4 | 5 | 2.1 | 1.8 |
| October | 30.10 | ---- | 30.77 | 29.50 | 1.27 | 56 | ---- | 48 | ---- | 80 | 30 | 50 | 79 | 5 | .89 | 5 | 1.52 | 2.9 | 3 | 4 | 5 | 2 | 3 | 2 | 2 | 4 | 6 | 2.1 | 5.5 |
| November | 30.13 | ---- | 30.80 | 29.29 | 1.51 | 44 | ---- | 37 | ---- | 70 | 9 | 61 | 86 | 7 | 1.15 | 7 | 1.32 | 3.0 | 3 | 4 | 6 | 2 | 2 | 1 | 2 | 4 | 6 | 1.2 | 6.0 |
| December | 30.12 | ---- | 30.86 | 29.18 | 1.68 | 36 | ---- | 33 | ---- | 62 | 3 | 59 | 89 | 8 | 1.01 | 9 | 1.48 | 3.0 | 3 | 5 | 5 | 2 | 3 | 2 | 2 | 4 | 5 | 1.7 | 5.4 |
| Means | 30.01 | ---- | ---- | ---- | ---- | 53 | ---- | 46 | ---- | ---- | ---- | ---- | 79 | 6 | | | | 2.9 | | | | | | | | | | | |
| Total | ---- | ---- | ---- | ---- | ---- | | | | | | | | ---- | ---- | 13.67 | 79 | ---- | ---- | 38 | 50 | 48 | 27 | 39 | 24 | 28 | 47 | 64 | 16.6 | 37.5 |
| Extreme values | ---- | ---- | 31.04 | 29.09 | 1.95 | ---- | ---- | ---- | ---- | 93 | −12 | 105 | ---- | ---- | ---- | ---- | 3.21 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Number of years' observations | 34 | ---- | 35 | | | | ---- | 7 | ---- | 35 | 16 | ---- | 17 | 35 | | | | 22 | 35 | | | | | | | | | 33 | 10 |

Based on observations at 7 a. m., 2 p. m., 9 p. m.
Authority: Annales de l'Observatoire Physique Central Nicholas, Petrograd.

*Place—Taganrog. Obs.* ⚠ *Lat. 47° 12′ N., long. 38° 57′ E. Height above M. S. L., 115 feet (35.1 m.)*

[Meteorological table compiled from 8 to 40 years' observations (1869–1908)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Nu mber of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.16 | ...... | 31.01 | 29.29 | 1.71 | 21 | .... | 14 | .... | 45 | −16 | 61 | 91 | 7 | 1.12 | 10 | 1.12 | 3.9 | 2 | 3 | 9 | 2 | 2 | 1 | 4 | 3 | 5 | 4 | 5 |
| February | 30.12 | ...... | 30.80 | 29.03 | 1.77 | 24 | .... | 21 | .... | 51 | −22 | 73 | 92 | 8 | 1.10 | 9 | 1.12 | 3.9 | 2 | 3 | 9 | 2 | 2 | 1 | 3 | 2 | 4 | 5 | 5 |
| March | 30.03 | ...... | 30.74 | 29.09 | 1.65 | 32 | .... | 27 | .... | 74 | −5 | 79 | 87 | 7 | 1.12 | 10 | .80 | 3.8 | 2 | 4 | 11 | 2 | 1 | 2 | 3 | 1 | 5 | 5 | 5 |
| April | 29.98 | ...... | 30.56 | 29.44 | 1.12 | 47 | .... | 40 | .... | 80 | +13 | 67 | 75 | 6 | 1.23 | 8 | .98 | 3.8 | 2 | 3 | 9 | 3 | 2 | 2 | 4 | 2 | 3 | 5 | 2 |
| May | 29.96 | ...... | 30.47 | 29.35 | 1.12 | 62 | .... | 54 | .... | 89 | 37 | 52 | 71 | 5 | 1.35 | 7 | 1.71 | 3.7 | 2 | 2 | 8 | 3 | 3 | 3 | 5 | 2 | 3 | 4 | 0.2 |
| June | 29.89 | ...... | 30.30 | 29.32 | .97 | 69 | .... | 62 | .... | 96 | 42 | 54 | 69 | 4 | 2.19 | 9 | 2.10 | 3.2 | 3 | 2 | 5 | 2 | 2 | 3 | 6 | 3 | 4 | 3 | 0 |
| July | 29.83 | ...... | 30.30 | 29.23 | 1.06 | 73 | .... | 66 | .... | 100 | 45 | 55 | 65 | 4 | 2.06 | 7 | 5.50 | 2.9 | 3 | 2 | 5 | 2 | 2 | 3 | 7 | 3 | 4 | 2 | 0 |
| August | 29.90 | ...... | 30.30 | 29.32 | .97 | 73 | .... | 64 | .... | 98 | 44 | 54 | 70 | 3 | 1.03 | 5 | 1.41 | 2.9 | 3 | 3 | 7 | 2 | 2 | 2 | 4 | 3 | 5 | 2 | 0 |
| September | 30.00 | ...... | 30.47 | 29.50 | .97 | 62 | .... | 53 | .... | 92 | 27 | 65 | 70 | 4 | 1.08 | 5 | 1.44 | 3.3 | 3 | 3 | 8 | 2 | 2 | 1 | 5 | 3 | 3 | 3 | 0.5 |
| October | 30.11 | ...... | 30.80 | 29.41 | 1.39 | 50 | .... | 43 | .... | 86 | 23 | 63 | 82 | 5 | 1.11 | 7 | 1.17 | 3.6 | 2 | 3 | 10 | 2 | 2 | 1 | 4 | 2 | 5 | 4 | 4 |
| November | 30.13 | ...... | 30.77 | 29.18 | 1.59 | 36 | .... | 30 | .... | 63 | +4 | 59 | 88 | 7 | 1.25 | 8 | 1.48 | 3.6 | 2 | 3 | 9 | 2 | 2 | 1 | 4 | 3 | 4 | 4 | 7 |
| December | 30.12 | ...... | 30.83 | 29.26 | 1.56 | 27 | .... | 22 | .... | 51 | −10 | 61 | 92 | 8 | 1.45 | 11 | 1.08 | 3.6 | 2 | 3 | 10 | 3 | 2 | 1 | 3 | 2 | 5 | 4 | 9 |
| Means | 30.02 | | | | | 48 | | 41 | | | | | 79 | 6 | | | | 3.5 | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 16.09 | 96 | | | 28 | 34 | 100 | 27 | 24 | 21 | 52 | 29 | 50 | 45 | 38 |
| Extreme values | | | 31.01 | 29.03 | 1.98 | | | | | 100 | −22 | 122 | | | | | 5.50 | | | | | | | | | | | | |
| Number of years' observations | 39 | ...... | 30 | | | 39 | .... | 18 | .... | 30 | | | 8 | 30 | | | | 21 | 40 | | | | | | | | | 28 | 10 |

Based on observations at 7 a. m., 2 p. m., 9 p. m.
Authority: Annales de l'Observatoire Physique Central Nicholas, Petrograd.

*Place—Novorossisk. Obs.* △ *Lat. 44° 44′ N., long. 37° 49′ E. Height above M. S. L., 122 feet (37.2 m.)*

**[Meteorological table compiled from 12 to 38 years' observations (1870–1908)]**

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | | | | | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | Total fall | Number of days | Maximum fall in 24 hours | Mean force, Beaufort scale | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | °*F.* | *P.ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.12 | ...... | 30.98 | 29.29 | 1.68 | 35 | .... | 29 | .... | 62 | −9 | 71 | 75 | 7 | 3.28 | 12 | 2.58 | 3.6 | 3 | 6 | 1 | 3 | 4 | 2 | 2 | 4 | 6 | 4.7 | 1.4 |
| February | 30.08 | ...... | 30.68 | 29.09 | 1.59 | 37 | .... | 33 | .... | 61 | −15 | 76 | 76 | 7 | 2.48 | 11 | 2.34 | 3.5 | 2 | 6 | 1 | 4 | 3 | 2 | 2 | 3 | 5 | 4.2 | 1.3 |
| March | 30.00 | ...... | 30.65 | 29.09 | 1.56 | 42 | .... | 36 | .... | 71 | −3 | 74 | 73 | 7 | 2.60 | 11 | 3.89 | 3.3 | 2 | 7 | 1 | 5 | 3 | 2 | 2 | 3 | 6 | 3.5 | 1.5 |
| April | 29.97 | ...... | 30.47 | 29.26 | 1.21 | 51 | .... | 44 | .... | 82 | +26 | 56 | 70 | 6 | 1.79 | 10 | 2.17 | 3.1 | 1 | 6 | 2 | 6 | 4 | 1 | 1 | 2 | 7 | 2.6 | 2.9 |
| May | 29.97 | ...... | 30.36 | 29.35 | 1.00 | 62 | .... | 53 | .... | 85 | 39 | 46 | 73 | 6 | 1.68 | 8 | 2.64 | 2.8 | 1 | 5 | 3 | 6 | 4 | 1 | 1 | 2 | 8 | 1.9 | 3.3 |
| June | 29.91 | ...... | 30.24 | 29.50 | .74 | 70 | .... | 62 | .... | 92 | 48 | 44 | 73 | 5 | 2.21 | 8 | 3.03 | 2.4 | 2 | 4 | 3 | 5 | 3 | 1 | 2 | 2 | 8 | .7 | .8 |
| July | 29.86 | ...... | 30.24 | 29.32 | .91 | 76 | .... | 66 | .... | 102 | 53 | 49 | 66 | 4 | 1.95 | 7 | 2.36 | 2.5 | 2 | 5 | 2 | 4 | 2 | 2 | 2 | 3 | 9 | 1.4 | .9 |
| August | 29.89 | ...... | 30.33 | 29.47 | .86 | 75 | .... | 67 | .... | 97 | 49 | 48 | 61 | 3 | 1.39 | 5 | 2.86 | 2.9 | 3 | 7 | 2 | 3 | 2 | 1 | 2 | 4 | 7 | 2.3 | 1.7 |
| September | 30.01 | ...... | 30.47 | 29.41 | 1.06 | 66 | .... | 58 | .... | 94 | 34 | 60 | 65 | 4 | 1.87 | 6 | 2.61 | 3.1 | 3 | 8 | 2 | 2 | 2 | 1 | 2 | 3 | 7 | 2.9 | 1.3 |
| October | 30.08 | ...... | 30.80 | 29.50 | 1.30 | 59 | .... | 51 | .... | 84 | 21 | 63 | 69 | 5 | 1.56 | 8 | 1.41 | 3.1 | 2 | 7 | 1 | 4 | 3 | 2 | 2 | 3 | 7 | 3.3 | 2.0 |
| November | 30.12 | ...... | 30.74 | 29.35 | 1.39 | 47 | .... | 39 | .... | 76 | +10 | 66 | 74 | 7 | 2.58 | 10 | 4.04 | 3.5 | 3 | 7 | 1 | 3 | 3 | 1 | 2 | 4 | 6 | 4.4 | 2.8 |
| December | 30.09 | ...... | 30.80 | 29.29 | 1.51 | 41 | .... | 34 | .... | 65 | −17 | 82 | 76 | 7 | 3.41 | 13 | 2.17 | 3.5 | 3 | 6 | 1 | 3 | 4 | 2 | 2 | 4 | 6 | 3.8 | 1.3 |
| Means | 30.00 | ...... | | | | 55 | .... | 48 | .... | | | | 71 | 6 | | | | 3.1 | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 26.80 | 109 | | | 27 | 74 | 20 | 48 | 37 | 18 | 22 | 37 | 82 | 35.7 | 21.2 |
| Extreme values | | | 30.98 | 29.09 | 1.89 | | | | | 102 | −17 | 119 | | | | | 4.04 | | | | | | | | | | | | |
| Number of years' observations | 37 | ...... | 33 | | | 35 | .... | 18 | .... | 35 | | | 38 | 35 | 34 | | | 29 | 22 | | | | | | | | | 35 | 12 |

Based on observations at 7 a. m., 2 p. m., 9 p. m.
Authority: Annales de l'Observatoire Physique Central Nicholas, Petrograd.

*Place—Batum. Obs.* △ *Lat. 41° 40′ N., long. 41° 38′ E. Height above M. S. L., 10 feet (3 m.)*

[Meteorological table compiled from 9 to 38 years' observations (1870–1908)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | Total fall | Number of days | Maximum fall in 24 hours | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | | | | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | *Ins.* | *Ins.* | *Ins.* | *Ins.* | *Ins.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | ° *F.* | *P. ct.* | | *Ins.* | | *Ins.* | | | | | | | | | | | | |
| January | 30.13 | ---- | 30.77 | 29.29 | 1.48 | 43 | ---- | 37 | ---- | 73 | 18 | 55 | 76 | 6 | 10.11 | 15 | 3.64 | 1.9 | 2 | 2 | 5 | 4 | 4 | 5 | 1 | 1 | 7 | 2.4 | 3 |
| February | 30.09 | ---- | 30.59 | 29.26 | 1.33 | 44 | ---- | 39 | ---- | 73 | 21 | 52 | 78 | 6 | 7.14 | 13 | 2.87 | 1.7 | 2 | 2 | 3 | 3 | 3 | 6 | 1 | 1 | 7 | 1.9 | 4 |
| March | 30.02 | ---- | 30.71 | 29.15 | 1.56 | 47 | ---- | 40 | ---- | 85 | 21 | 64 | 79 | 6 | 5.89 | 13 | 2.89 | 1.7 | 2 | 2 | 3 | 2 | 2 | 8 | 2 | 1 | 9 | 2.2 | 4 |
| April | 29.98 | ---- | 30.47 | 29.29 | 1.18 | 53 | ---- | 46 | ---- | 81 | 30 | 51 | 81 | 6 | 4.93 | 13 | 2.91 | 1.7 | 3 | 2 | 2 | 1 | 2 | 8 | 2 | 2 | 8 | 1.7 | 4 |
| May | 29.97 | ---- | 30.39 | 29.44 | .94 | 62 | ---- | 54 | ---- | 84 | 39 | 45 | 83 | 6 | 3.26 | 11 | 3.87 | 1.3 | 2 | 1 | 2 | 1 | 2 | 8 | 3 | 3 | 9 | 1.6 | 4 |
| June | 29.92 | ---- | 30.27 | 29.47 | .80 | 70 | ---- | 62 | ---- | 89 | 51 | 38 | 81 | 5 | 6.73 | 11 | 6.18 | 1.4 | 2 | 1 | 2 | 1 | 2 | 7 | 3 | 3 | 9 | .9 | 1 |
| July | 29.87 | ---- | 30.21 | 29.38 | .83 | 74 | ---- | 67 | ---- | 95 | 55 | 40 | 82 | 5 | 6.42 | 12 | 5.79 | 1.2 | 1 | 1 | 2 | 1 | 2 | 7 | 4 | 3 | 10 | .3 | 1 |
| August | 29.89 | ---- | 30.24 | 29.44 | .80 | 75 | ---- | 68 | ---- | 91 | 55 | 36 | 82 | 5 | 9.35 | 13 | 10.28 | 1.3 | 1 | 1 | 2 | 1 | 2 | 7 | 4 | 3 | 10 | .5 | 1 |
| September | 30.00 | ---- | 30.42 | 29.50 | .91 | 69 | ---- | 60 | ---- | 86 | 44 | 42 | 83 | 5 | 12.10 | 13 | 7.53 | 1.4 | 1 | 1 | 2 | 2 | 3 | 6 | 3 | 3 | 9 | .7 | 3 |
| October | 30.06 | ---- | 30.71 | 29.50 | 1.21 | 62 | ---- | 55 | ---- | 86 | 40 | 46 | 83 | 4 | 9.23 | 11 | 4.92 | 1.5 | 3 | 1 | 2 | 2 | 2 | 5 | 3 | 3 | 10 | 1.0 | 5 |
| November | 30.11 | ---- | 30.68 | 29.50 | 1.18 | 54 | ---- | 46 | ---- | 83 | 31 | 52 | 80 | 6 | 12.73 | 14 | 5.12 | 1.7 | 2 | 2 | 3 | 3 | 3 | 5 | 2 | 2 | 8 | 1.5 | 2 |
| December | 30.09 | ---- | 30.68 | 29.38 | 1.30 | 49 | ---- | 41 | ---- | 78 | 21 | 57 | 76 | 6 | 10.38 | 14 | 3.94 | 1.6 | 2 | 2 | 4 | 4 | 3 | 5 | 1 | 1 | 9 | 1.6 | 2 |
| Means | 30.00 | ---- | ---- | ---- | ---- | 59 | ---- | 51 | ---- | ---- | ---- | ---- | 80 | 6 | | | | 1.5 | | | | | | | | | | | |
| Total | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 98.27 | 1.53 | | ---- | 23 | 18 | 32 | 25 | 30 | 77 | 29 | 26 | 105 | 16.3 | 34 |
| Extreme values | ---- | ---- | 30.77 | 29.15 | 1.62 | ---- | ---- | ---- | ---- | 95 | 18 | 77 | ---- | ---- | ---- | ---- | 10.28 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Number of years' observations | 38 | ---- | 26 | | | 38 | ---- | 13 | ---- | 26 | 24 | 24 | 17 | 26 | | | | 19 | 26 | | | | | | | | | 22 | 9 |

**Hours of observations,** 7 a. m., 2 p. m., 9 p. m.
**Authority:** Annales de l'Observatoire Physique Central Nicholas, Petrograd.

*Place—Samsun. Obs.* ⚠ *Lat. 41° 18′ N., long. 36° 19′ E. Height above M. S. L., 26 feet (7.9 m.)*

[Meteorological table compiled from 1 to 33 years' observations (1880-1913)]

| Month | Barometer, at 32° F., mean sea level, lat. 45° | | | | | Air temperature | | | | | | | Relative humidity | Cloud amount. Scale 0 to 10 | Rain | | | Wind | | | | | | | | | | Number of days gales | Number of days fogs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Extreme | | | Mean | | | | Extreme | | | | | Total fall | Number of days | Maximum fall in 24 hours | Mean force, Beaufort scale | Number of days from— | | | | | | | | | | |
| | For month | Daily range | Maximum | Minimum | Range | For month | Maximum | Minimum | Range | Maximum | Minimum | Range | | | | | | | N. | NE. | E. | SE. | S. | SW. | W. | NW. | Calm | | |
| | Ins. | Ins. | Ins. | Ins. | Ins. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | P. ct. | | Ins. | | Ins. | | | | | | | | | | | | |
| January | 30.01 | | | | | 45 | 52 | 38 | 14 | 68 | 27 | 41 | 64 | 7 | 3.15 | 8 | | | 0 | 3 | 0 | 6 | 2 | 9 | 0 | 11 | 0 | | |
| February | 30.04 | | | | | 44 | 51 | 37 | 14 | 74 | 32 | 42 | 74 | 8 | 2.28 | 7 | | | 0 | 6 | 0 | 2 | 1 | 6 | 0 | 13 | 0 | | |
| March | 29.99 | | | | | 46 | 54 | 39 | 15 | 69 | 35 | 34 | 73 | 7 | 2.92 | 9 | | | 1 | 6 | 0 | 7 | 2 | 3 | 0 | 12 | 0 | | |
| April | 29.93 | | | | | 52 | 58 | 46 | 12 | 88 | 35 | 53 | 65 | 7 | 2.60 | 10 | | | 1 | 8 | 0 | 4 | 2 | 2 | 0 | 13 | 0 | | |
| May | 29.94 | | | | | 61 | 68 | 55 | 13 | 97 | 36 | 61 | 70 | 7 | 1.89 | 6 | | | 0 | 10 | 0 | 6 | 2 | 2 | 0 | 11 | 0 | | |
| June | 29.90 | | | | | 67 | 75 | 59 | 16 | 90 | 51 | 39 | 70 | 4 | 1.50 | 6 | | | 0 | 11 | 1 | 5 | 1 | 0 | 0 | 12 | 0 | | |
| July | 29.85 | | | | | 73 | 80 | 67 | 13 | 89 | 54 | 35 | 67 | 4 | 0.71 | 5 | | | 1 | 9 | 1 | 2 | 2 | 1 | 1 | 14 | 0 | | |
| August | 29.87 | | | | | 75 | 81 | 68 | 13 | 90 | 59 | 31 | 68 | 3 | 1.06 | 3 | | | 0 | 10 | 1 | 3 | 2 | 0 | 0 | 14 | 1 | | |
| September | 29.99 | | | | | 71 | 78 | 64 | 14 | 94 | 55 | 39 | 71 | 5 | 2.13 | 7 | | | 1 | 8 | 1 | 3 | 1 | 0 | 0 | 15 | 1 | | |
| October | 30.06 | | | | | 62 | 69 | 55 | 14 | 89 | 40 | 49 | 71 | 5 | 2.76 | 9 | | | 1 | 8 | 0 | 5 | 2 | 3 | 0 | 11 | 1 | | |
| November | 30.09 | | | | | 56 | 62 | 50 | 12 | 80 | 42 | 38 | 64 | 6 | 4.02 | 10 | | | 1 | 5 | 0 | 6 | 1 | 4 | 0 | 13 | 0 | | |
| December | 30.08 | | | | | 48 | 54 | 41 | 13 | 70 | 34 | 36 | 72 | 6 | 3.62 | 7 | | | 0 | 4 | 0 | 6 | 2 | 9 | 0 | 10 | 0 | | |
| Means | 29.99 | | | | | 58 | 65 | 52 | 13 | | | | 69 | 6 | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 28.64 | 87 | | | 6 | 88 | 4 | 55 | 20 | 39 | 1 | 149 | 3 | | |
| Extreme values | | | | | | | | | | 97 | 27 | 70 | | | | | | | | | | | | | | | | | |
| Number of years' observations | 33 | | | | | 3 | | | | 1-2 | | | | 2 | 10 | 9 | | | 6 | | | | | | | | | | |

Authorities: Annales dur Bureau Central Meteor., France, 1882.
Buchan, A., "Challenger" Report Circulation of the Atmosphere. M. S. data in M. O.

# APPENDIX IV

Abnormal values of the magnetic variation have been reported at places given in the following list. Particular attention should therefore be paid to the indications of the compass when navigating in their vicinity:

| Place | Remarks |
|---|---|
| Kalolimno Island | Southward of. |
| Cape Caliacra | Between Capes Caliacra and Shableh. |
| Odessa | Between Odessa and Morskaya Bank, $8\frac{1}{2}$ miles eastward from the mouth of the Dniester, an error of from 2° to $5\frac{1}{2}$° having been reported. |
| Kertch Strait | Considerable local disturbance has been reported. |
| Sinub | A disturbance of $2\frac{1}{2}$° has been reported. |

# APPENDIX V

## REGULATIONS FOR KERTCH STRAIT

### I. EXAMINATION OF SHIPS

1. All vessels, without exception, when navigating by the channel or by the Kertch-Yenikale Strait must carry their national flag by day and regulation lights by night.

2. All foreign vessels and Russian seagoing vessels, when navigating by the channel, must take a pilot of the Association of Kertch-Yenikale Pilots.

3. All foreign steam vessels coming from the Sea of Azov and drawing not more than 3½ feet less than the depth of the channel indicated by signal, will be conducted by the said pilots from the Yenikale Roadstead along the channel, and will anchor in the southern transshipment (Tuzla) roadstead. At the end of the examination these vessels will weigh and be conducted into the Black Sea.

4. All steam vessels whose draft exceeds that stated in the preceding paragraph will stop for examination in the broad portion of the channel off the Tuzla black buoy, as indicated by the pilot.

5. If weather conditions or a great congestion of the steam vessels mentioned in paragraph 3 do not permit of an examination being made off the Tuzla buoy, the pilot of the association, on a representation being made to the customs inspector on board the steamer, will conduct her toward the Tuzlinski Light Vessel, where she will anchor for examination.

6. Should the weather allow of the examination taking place when the vessel is under way in the channel itself, such steamer (if coming from the Sea of Azov) will reduce speed in order to take on board from a boat the examination officials.

7. Steam vessels proceeding with pilots from Kertch to the Sea of Azov must get under way from the Kertch Roadstead at such a time as to pass the guard ship not later than half an hour after sunset, which moment may be considered the time for lighting up the lighthouses.

8. Masters of vessels having finished all the quarantine and customs formalities will receive from the Kertch customs a permit for

free passage into the Sea of Azov. This permit will, when the vessel is passing the guard ship, be handed over to the guard ship, after which she will be allowed to proceed into the Sea of Azov.

9. All steam vessels returning from the Sea of Azov must when entering the strait stop in the Yenikale Roadstead, and also present their documents to the captain of the guard ship, who, after satisfying himself of the draft of the vessel, will permit her passage through the channel or will point out to what extent the vessel must be unloaded.

10. Should the vessel arriving fail to present her documents to the guard ship at the Yenikale end and continue to proceed along the channel, the guard ship may fire at such vessel as follows: The first two shots, blank; the third, shotted, past the ship; then the ship herself will be fired upon until she stops.

NOTE.—The cost of the firing, calculated by the guard ship, will be paid by the masters of vessels or by their agents to the port authorities for transmission to proper destination.

## II. MOVEMENT OF SHIPS

11. All vessels drawing 11½ feet and upward, if passing through the Kertch-Yenikale Strait in that section of it between the meridians of Kapkani Village and the Yenikale Lighthouse, must proceed by the channel, the depth of which is indicated by signals hoisted on board the guard ship and at the pilot mast in Yenikale. These signals will serve as an indication regarding the possibility or otherwise of passing the channel, according to the given draft of the ship.

12. Vessels drawing ½ foot less than its depth indicated at the said masts may proceed along the channel. If the depth is insufficient the ship must either discharge the necessary amount of cargo or lie at anchor until the water rises.

13. All vessels drawing less than 11½ feet must by day proceed by the strait, that is, outside the limits of the channel, along the edge of the red or black spar buoys, depending on the indications of the chart and the sailing directions. By night these vessels, in order to avoid danger from the shoals extending on either side of the dredged channel near and abreast Yenikale Point, must proceed only by the dredged channel.

NOTE.—When proceeding by the strait during the day, that is, outside the channel, along the edge of the red spar buoys, these vessels must during the season of herring fishing, that is, from September 28 up to the end of the fishing season, not deviate from the said edge more than 100 sazhens (250 yards), and on no account make a short cut across the waters allotted to the fishing.

14. All vessels proceeding by the channel must have an anchor ready to let go at any moment.

15. Sailing vessels drawing more than 11½ feet, in the absence of a favorable wind and current, must not proceed by the channel except in tow of a steam vessel.

16. Sailing vessels, when beating against the wind in the channel, must regulate their course with the movement of steamships proceeding along the channel and give way to them.

17. Merchant vessels proceeding along the channel, if meeting war vessels and also if being overtaken by them, must give way to them if possible.

18. All vessels are prohibited from entering the channel two or more at a time. A vessel entering the channel must not approach the vessel proceeding ahead of her closer than 700 yards.

19. Vessels arriving at Kertch to take in cargo must anchor in the southern transshipment (Tuzla) roadstead, the northern limit of which is indicated by white cylindrical buoys, before passing the meridian of these buoys.

20. Masters of vessels making use of this roadstead for loading purposes, and also for customs and quarantine formalities, to avoid the possibility of damage must bear in mind that this roadstead has at the present time (1914) a depth at the ordinary level of the water of 20½ feet (6.2 m.).

21. Vessels are absolutely prohibited from anchoring—

(*a*) Near the black light buoy marking the extremity of Tuzla Spit, in order not to cover it from view.

(*b*) In the space between the western limit of the fortress as far as the middle of the mole of Pavlovski Haven on the one side, and as far as the range lines of the Churubash and Kamish Burnu Lighthouses on the other; this prohibited space, which is shown on the chart of the strait, is marked on the side of the leading line by two red spar buoys surmounted by red flags.

(*c*) On the line of telegraph cables shown on the chart.

(*d*) In the interval of time from May 4 to October 28 in the limits from the meridian of the fortress flagstaff to the meridian of the visible extremity of Tuzla Spit, and from the parallel of the same extremity to the parallel of Cape Pavlovski.

22. Vessels proceeding by the channel must not exceed a speed of 8 knots.

23. Vessels anchoring in the southern transshipment (Tuzla) roadstead must drop anchor not closer than 100 yards to the line of the black spar buoys.

24. Captains of vessels who have destroyed or damaged any of the buoys or spar buoys must immediately pay for their cost or the cost of repairs, as determined by the pilot master.

25. A steamer may tow along the channel one large vessel or not more than two barges abreast of each other with the towrope shortened in. It is absolutely prohibited to take vessels in tow alongside the vessel towing.

26. All vessels are strictly prohibited from throwing overboard any sort of ashes, refuse, or ballast in the limits of the port waters.

27. During fog, thick haze, or mist no vessel is allowed to enter the channel or proceed along it. Vessels which are permitted to proceed along the channel by night are prohibited from entering it if the range lighthouses and light buoys are hidden in fog, haze, or mist. If, however, the vessels encounter a fog when proceeding along the channel, they must anchor in it with all precautions and make the usual signals. As soon as possible they must weigh and continue on their course.

28. Every requirement of the port, pilot, customs, and quarantine authorities, and also of the coast guard, concerning the stopping of the vessel, expressed by whistle or other method, must be immediately carried out, provided the ship by doing so does not run the risk of striking a shoal, colliding with other vessels, or blocking up the channel.

## III. Navigation During the Time when Dredging Operations are in Progress in the Strait

48. Vessels drawing less than 11½ feet must proceed by Old Yenikale Channel.

49. The following hours are laid down for the passage of vessels with deeper draft:

(*a*) From the Sea of Azov to the Black Sea: From sunrise to 8 a. m. from May 14 to September 14, to 9 a. m. from September 14 to May 14, and all the year round from 1 p. m. to 5 p. m.

(*b*) From the Black Sea to the Sea of Azov: From 9 a. m. from May 14 to September 14, and from 10 a. m. from September 14 to May 14, in both cases to 12 noon, and all the year round from 6 p. m. to sunset.

Note 1.—The time for the movement of vessels from the Sea of Azov to the Black Sea and the reverse is indicated by the guard ship by hoisting under its guard ship flag a red flag, which will be repeated by the dredger.

Note 2.—The spar buoys marking the channel may be removed in case of necessity, according to the movement of position of the dredger along the channel.

NOTE 3.—The position of the anchorage of the dredger at night will be indicated by two electric lanterns.

50. Every vessel approaching the dredger must make herself known in good time by three prolonged whistles.

51. Vessels must not go within the site of dredging operations, the area of which will be marked by special buoys.

NOTE.—Not less than 140 feet will be left while the vessel is passing between the side of the channel and the place where the dredger is anchored, while the chains of the dredger on the side of the passing vessel must be paid out. Barges will lie on the outer side of the channel.

52. Steam vessels when passing the side of a dredger must stop their engines.

53. Coasting trade vessels which may be permitted to pass along the channel by night, when approaching the dredging flotilla must haul out of the channel into the strait.

54. The guard ship and pilot commander will be responsible for the instructions in this section being carried out.

55. Persons infringing these regulations will pay the cost of all damages caused to the dredging flotillas, the amount of which will be fixed by the port authorities.

# APPENDIX VI

## REGULATIONS FOR THE PORT OF ROSTOV-ON-DON

The following extracts have been made from the port regulations:

All vessels approaching the port must fly their national flag.

Vessels of every description are forbidden to anchor in the reaches of the river, the canals, or dredged channels.

Between the railway and floating bridges vessels are only permitted to turn under steam or by aid of a tug.

Vessels are forbidden to anchor between the railway bridge and the line of the black shields with white anchors (violet lights at night) below that bridge on the right bank.

Small vessels must give way to large vessels.

Vessels crossing the river must give way to all vessels proceeding up or down stream.

When passing through the railroad bridge vessels must proceed through the right-hand opening, viz, the southern for vessels bound upstream and the northern for those bound downstream.

Steam vessels must conform to the regulations issued by the port authorities for signalling by means of steam whistles.

# APPENDIX VII

## RULES REGULATING THE CALLING OF MERCHANT VESSELS AT RUSSIAN PORTS (DATED JANUARY 20, 1925)

1. All vessels coming from abroad may enter only those ports where customhouses are to be found, and also those opened to foreign whalers and seal schooners by joint regulations of the People's Commissariat for Foreign Affairs, the People's Commissariat for Foreign Trade, and the United Political State Administration.

2. Should any port be closed owing to unforeseen circumstances so that foreign vessels could not be advised in good time of such closing, all vessels desiring to enter the port must keep a sharp lookout for the signals and lights described below, which are exhibited in some conspicuous position on the shore or by the light vessel standing near to the entrance of the port.

Three red vertical lights by night and three red vertical balls by day show that the port is closed.

In this case the vessels must either anchor in the outer anchorage or put out to sea.

3. Vessels wishing to enter into communication with the wireless telegraph stations of U. S. S. R. (Union of Soviet Social Republics) must communicate their call letters, the length of the wave, their reckoning (D. R.), and the port they are bound to.

4. Should a gun or a rocket be fired by the land battery all vessels should stop or "bring to" immediately. The entrance to the port is prohibited in thick or foggy weather or during a heavy snowfall if there was no preliminary contrary agreement by wireless, in which latter case the vessels must proceed at low speed, sounding the fog horn as prescribed by International rules.

5. Vessels approaching the ports of U. S. S. R. to the range of visibility by day must hoist their national flag and their signal letters, and by night they must carry all the ordinary lights in accordance with the international rules, and show their calling signals in Morse Code upon the first demand from shore.

6. The entrance of foreign vessels to all ports of U. S. S. R. on all the seas where pilot stations are established is allowed only under the guidance of a pilot.

7. To call the pilot on board the usual International signals are employed.

8. Masters are requested in their own interest to implicitly follow the instructions and directions of the pilot after the same has been taken on board.

9. The pilot flag hoisted at the mast of the pilot station signifies that a pilot is on the spot and will immediately come out. Should a ball be hoisted instead of a flag, it indicates that all the pilots are out.

10. Vessels arriving from abroad must hoist the quarantine flag at the foremast before entering the port, yellow if there is no illness on board and the vessel possesses a clear bill of health, and black and yellow checked (letter N of the International Code) should there be any cases of infectious diseases on board, such as cholera, plague, smallpox, typhoid fever, etc., or should the vessel possess a tainted bill of health.

The hoisting of the quarantine flag is equal to asking for the quarantine physician, who, on his arrival on board—

(1) Proceeds to oral questioning, entering the answers obtained into a specially printed inquiry form.

(2) Looks through all ship's sanitary documents.

(3) Inspects all the ship, including passengers' and crew's accommodations.

After the medical examination has been concluded and the vessel has been found in good sanitary order she is given a certificate granting the right to enter the port; otherwise the vessel is declared to be in quarantine, according to existing rules. After the medical examination is over and the ship has received its due sanitary certificate the master gives orders to lower the quarantine flag.

11. Vessels coming from abroad must not upon their arrival at the outer anchorage lower boats (except in case of accidents), communicate with the shore, drop anchor, or permit anybody to leave for the shore before due permission has been obtained from local authorities.

12. In accordance with orders issued by the People's Commissariat of Ways of Communications, the People's Commissariat for Foreign Trade, and the United Political State Administration on November 19, 1923, No. 11686, and on April 15, 1924, No. 800, the following rules have been established regulating the visits on board each vessel arriving in port. After the pilot, the vessel is boarded by the medical administration, who are followed by the officers of the United Political State Administration, the representative of the shipping company, and lastly by the official representatives of the commercial port.

13. Until the quarantine flag is lowered boarding the ship is prohibited to everybody, with the exception of the pilot and the medical officers.

14. Before the conclusion of the customhouse examination no one has the right to board or leave the vessel.

15. Masters of vessels arriving must show all the ship's documents and give all the necessary information to the representative of the administration.

16. Masters of vessels arriving undertake to strictly obey all port rules and regulations, which can also be transmitted to them by the wireless.

17. Masters of vessels arriving at the port under obligation are to advise the office of the commercial port administration of all damages and other incidents.

18. All details about the condition of aids to navigation may be obtained at the Ubecos (local hydrographic administration), their agencies, and at the office of the port administration.

## LIST OF CUSTOMHOUSE AGENCIES ON THE COAST OF U. S. S. R.

### Black Sea

1. Odessa.
2. Ochakov.
3. Nikolaev.
4. Kherson.
5. Skadovsk.
6. Khorli.
7. Eupatoria.
8. Sevastopol.
9. Yalta.
10. Theodosia.
11. Kertch.
12. Anapa.
13. Novorossisk.
14. Ghelenjik.
15. Tuapse.
16. Sochi.
17. Gagri.
18. Gudaut.
19. Sukhum.
20. Poti.
21. Batum.

### Sea of Azov

1. Genichesk.
2. Berdyansk.
3. Mariupol.
4. Taganrog.
5. Rostov-on-Don.
6. Yeisk.

Pilots are called by signal from the following pilot stations:

(*a*) Odessa pilot station, for vessels leaving Odessa.
(*b*) Nikolaev pilot station, town Nikolaev.
(*c*) Kherson pilot station, town Kherson.
(*d*) Skadovsk pilot station, town Skadovsk.
(*e*) Sevastopol pilot station, town Sevastopol.
(*f*) Streletsk pilot station, town Streletskaya Bay.
(*g*) Tuzlinski pilot station, on the light vessel "Tuzlinski," in Kertch Strait, Yenikale, or should the said light vessel be temporarily withdrawn, in the town of Kertch.
(*h*) Kertch pilot station, town Kertch.
(*i*) Novorossisk pilot station, town Novorossisk.

# APPENDIX VIII

## REGULATIONS FOR PREVENTING COLLISIONS WITH RUSSIAN SUBMARINES

1. Steam pinnaces escorting submarines will fly flag "V" of the Russian Military Code under a red ball at the masthead. This flag consists of a blue triangle, based on the hoist, with a border of white, which in turn is bordered by blue. This signal will be repeated by signal stations and guard vessels in the vicinity. In the open sea vessels are forbidden to approach the pinnace to a less distance than 1 mile. In roadsteads, rivers, channels, etc., the pinnace must not be passed nearer than ½ mile.

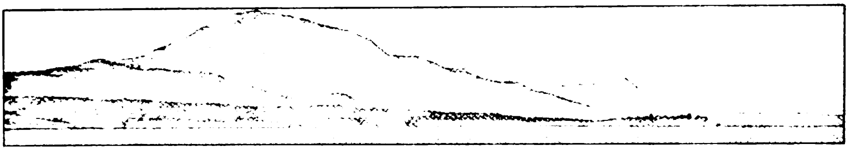
If the space available does not allow of the pinnace being passed at this distance a vessel when meeting her must, when at a distance of not less than ½ mile, stop her engines and must not proceed until the pinnace shall have passed her stern. If the vessel is overtaking the pinnace she must, before arriving within ½ mile distance, reduce her speed so as not to approach within that distance, and so continue until there is sufficient space for her to pass the pinnace at a distance of not less than ½ mile.

2. If a submarine is proceeding without an escort and her periscope is visible above water, every vessel on seeing it must observe the precautions laid down in paragraph 1.

3. A submarine not submerged but steaming above the water will act as a steamship when passing other vessels, being guided by the Regulations for Preventing Collisions at Sea.

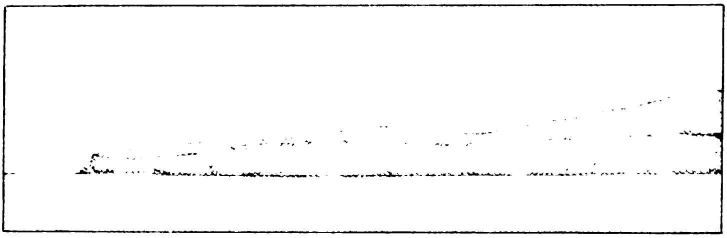
# APPENDIX IX
# VIEWS

(From Russian and British Admiralty Sailing Directions)



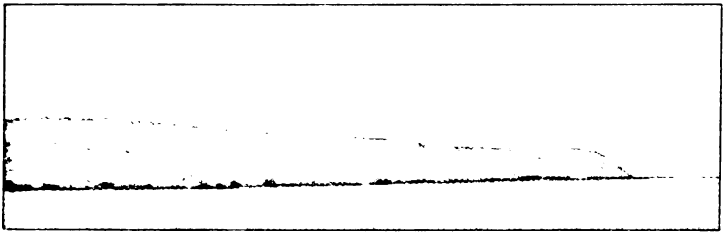
**View A**

Akhtebolu, bearing 303°, distant 5½ miles.



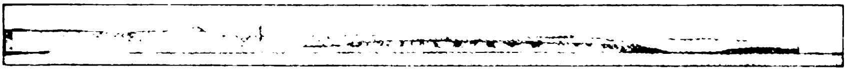
**View B**

Cape Emine, bearing 270°, distant 2 miles.



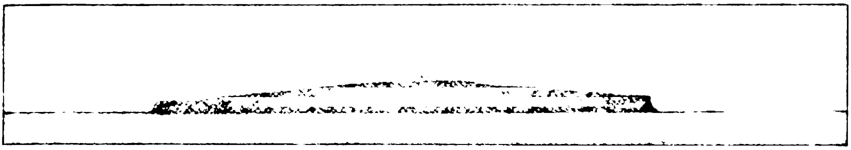
**View C**

Galata Burnu, bearing 315°, distant 1 mile.



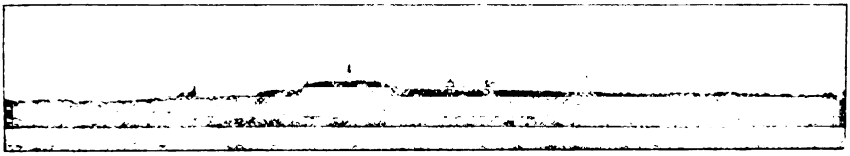
**View D**

Cape Shableh Lighthouse, bearing 293°, distant 3¾ miles.



**View E**

Fidonisi and Lighthouse, bearing 201°, distant 1 mile

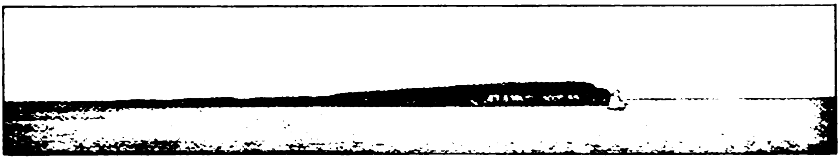


**View F**

Cape Fontan (Odessa approach). Lighthouse bearing 265°, distant 1 mile.

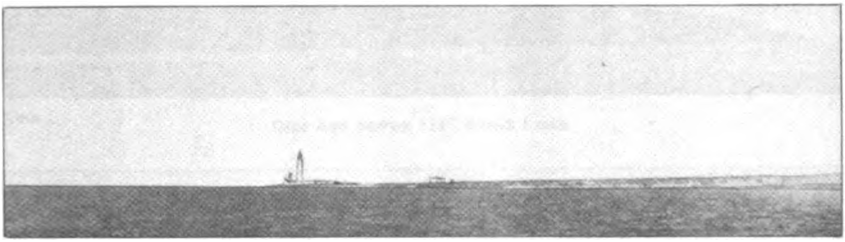
# APPENDIX IX

## VIEWS



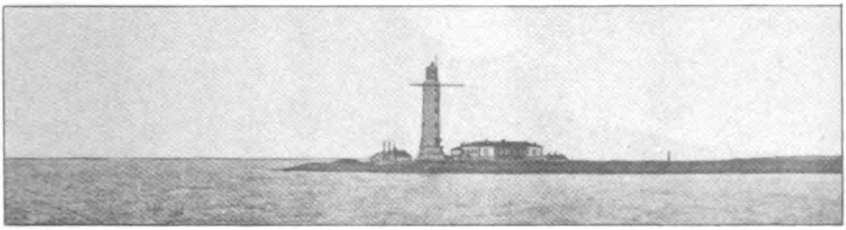
**View G**

Berezan Island, bearing 4°, distant ¾ mile.



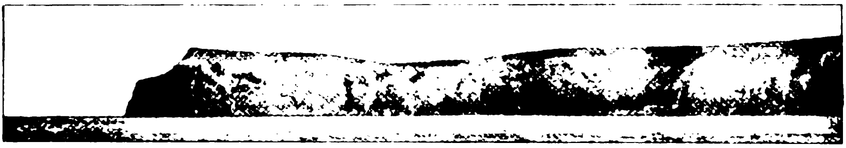
**View H**

Cape Tarkankut Lighthouse, bearing 29°, distant 1 mile.



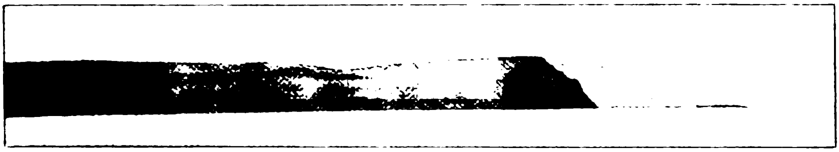
**View I**

Cape Khersonese Lighthouse, bearing 34°, distant ½ mile.



**View J**

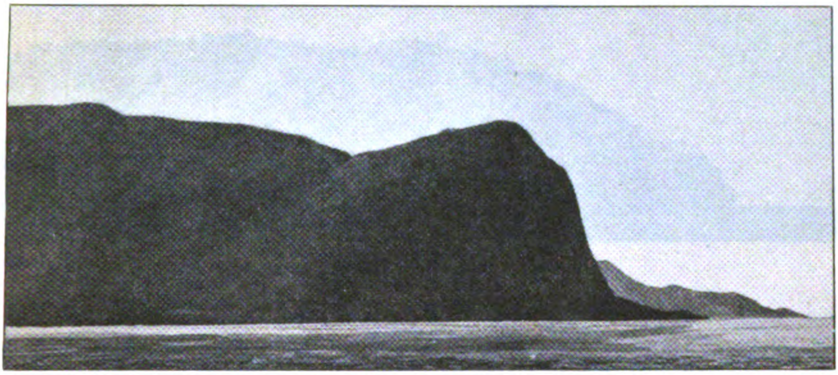
Cape Foelent, bearing 317°, distant 1¼ miles.



**View K**

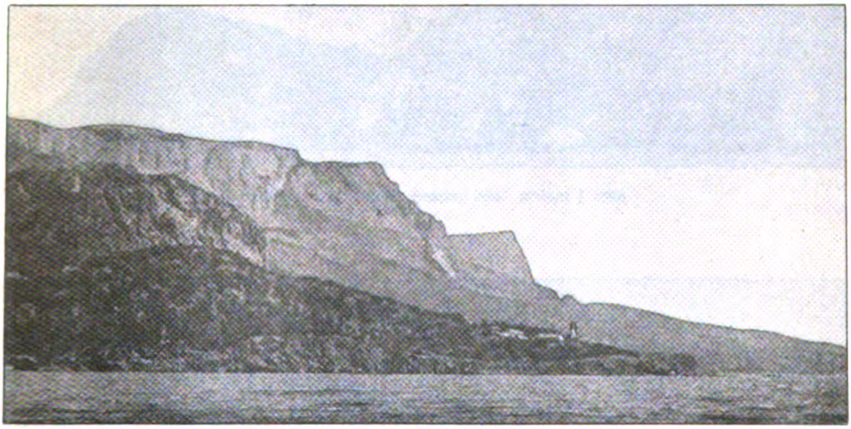
Capes Foelent and Aiya, bearing 121°

# APPENDIX IX
## VIEWS



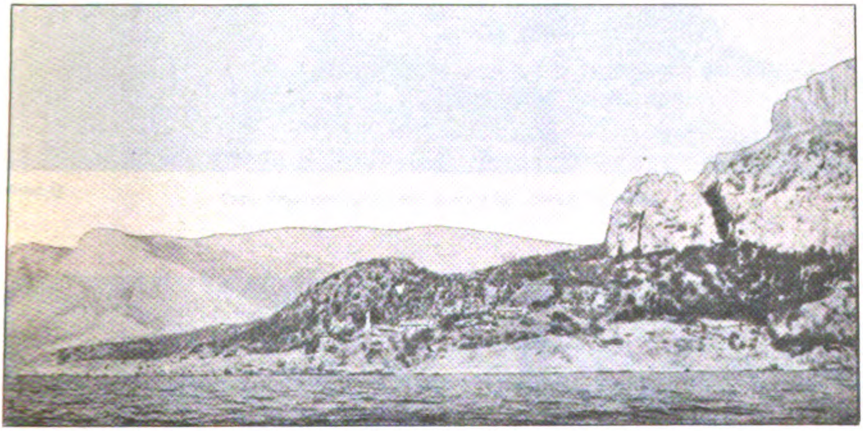
View L

Cape Aiya, bearing 113°, distant 1 mile.



View M

Sarich Point Lighthouse, bearing 75°, distant ¾ mile.



View N

Sarich Point Lighthouse, bearing 326°, distant ½ mile.

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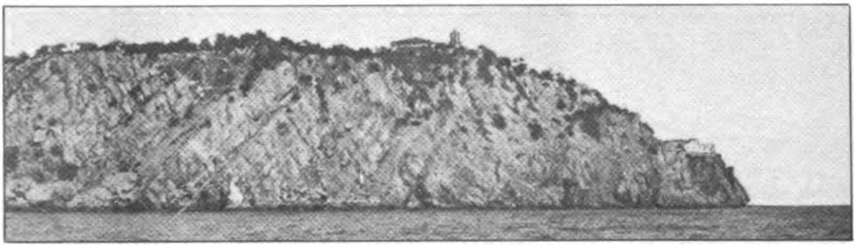
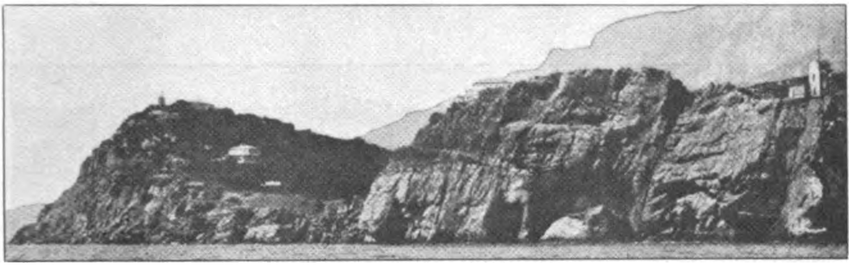
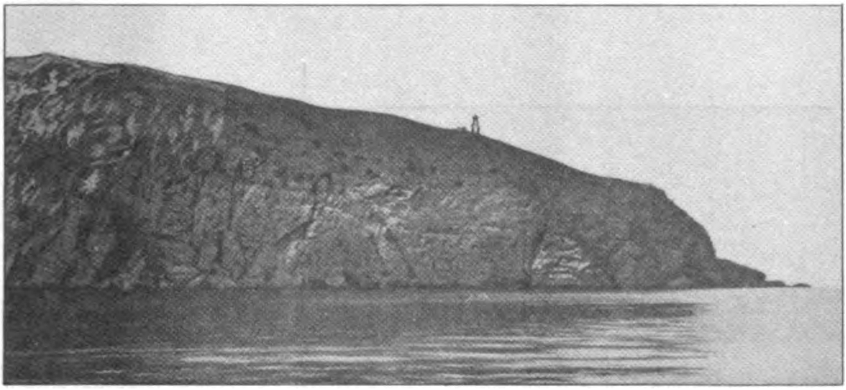


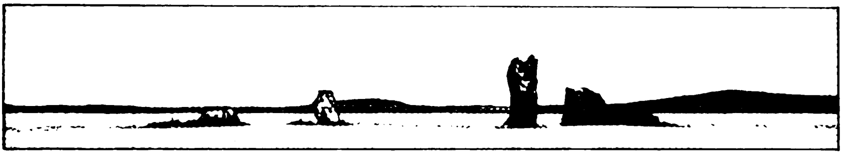
**View O** Cape Aitodor Lighthouse, bearing 49°, distant ½ mile.



**View P** Cape Aitodor Lighthouse, bearing 264°, distant ½ mile.



**View Q** Cape Meganom Lighthouse, bearing 88°, distant 1¼ miles.



**View R** Elchan Kaya Rocks, bearing 357°, distant ¼ mile.

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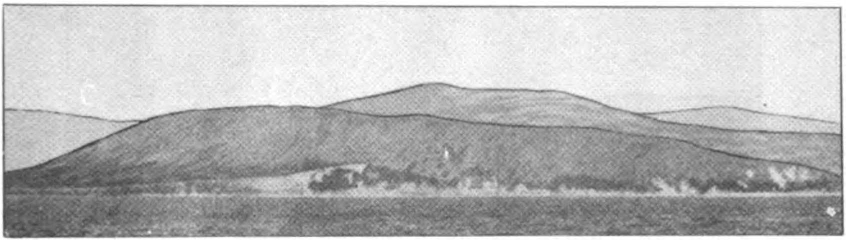
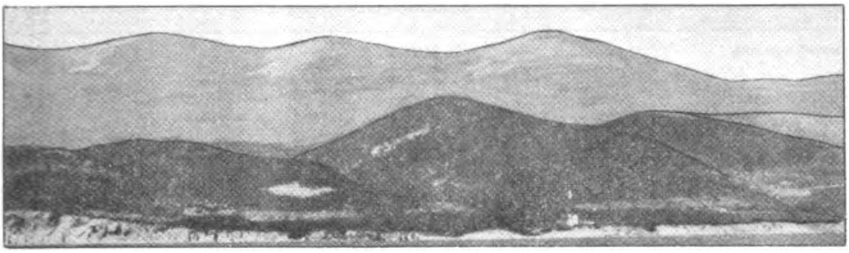


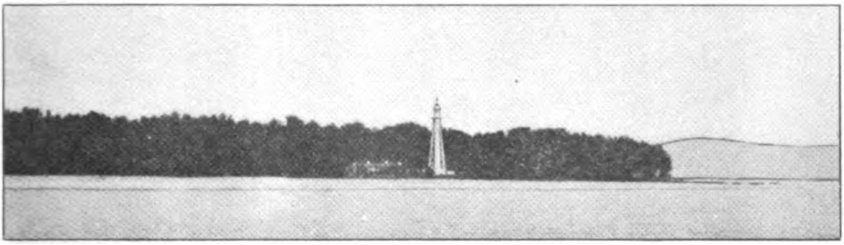
**View S**

Doob Point Lighthouse, bearing 90°, distant ½ mile.



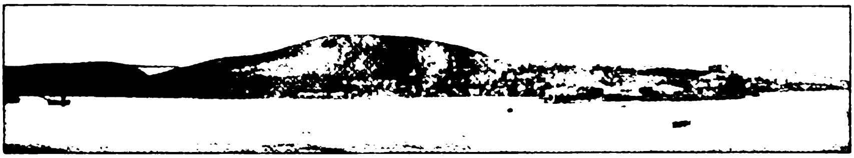
**View T**

Penai Point Lighthouse and beacon in range, bearing 55°, distant ⅓ mile.



**View U**

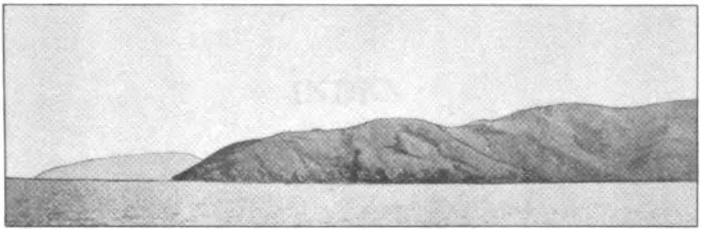
Pitsunda Point Lighthouse, bearing 21°, distant ½ mile.



**View V**

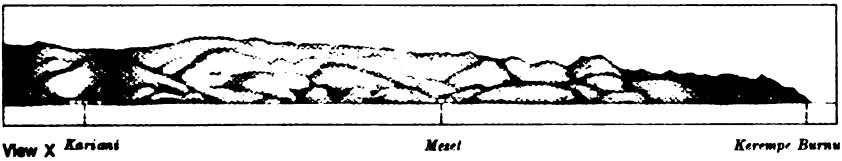
Trebizond.

# APPENDIX IX
## VIEWS



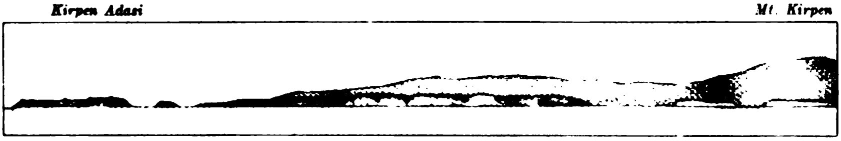
**View W**

Vona Point, bearing 135°, distant 3 miles.



**View X**

Kerempe Burnu, bearing 243°, distant 14¼ miles.



**View Y**

Kirpen Adasi, bearing 107°, distant 5 miles.

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| 171 | New Zealand Pilot. Including Kermadec Islands, Chatham Islands, and the off-lying islands southeastward and southward of New Zealand. |

The price of each of these books is $0.90. They may be purchased direct from the Hydrographic Office, Washington, D. C., or from sale agents of the office located at many ports, both in the United States and in foreign countries. A list of these agents is published weekly in the Hydrographic Bulletin and the Notice to Mariners.

Branch hydrographic offices are established at the places named below. Complete sets of Hydrographic Office publications are kept and the latest hydrographic information available to the office is placed at the disposal of masters and officers of vessels, who are invited to call and consult freely with the officers in charge.

### BRANCH OFFICES

| | |
|---|---|
| BOSTON | Fourteenth floor, Customhouse. |
| NEW YORK | Room 302, Maritime Exchange, 80 Broad Street. |
| PHILADELPHIA | Main floor, the Bourse Building. |
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(Also Headquarters Lakes Division, Branch Hydrographic Office)

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*Also operates continuously, during the open season of navigation, at the Canal Office, St. Marys Falls Canal, where the chief quartermaster on watch may be consulted at the hydrographic desk.

NOTE.—By authority of the Governor of the Panama Canal, some of the duties of branch hydrographic offices are performed by the captain of the port at Cristobal and the captain of the port at Balboa. Reference charts and sailing directions may be consulted at these offices, and shipmasters may receive the Pilot Charts, Notice to Mariners, and Hydrographic Bulletin in return for marine and meteorological data reports. Observers' blanks and comparisons of navigational instruments may be obtained at the same time.

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With a desire to render the best service possible to mariners, the commandant of the United States Coast Guard has kindly consented to assist the Hydrographic Office in its service by having several of the Coast Guard stations, in important ports where branch hydrographic offices are not available, perform some of the duties of branch offices.

The stations so far designated to serve in this capacity are:

PORTLAND, ME.—Commanding officer, U. S. Coast Guard cutter *Chicopee*, Customhouse.
PORTSMOUTH, N. H.—Superintendent, First Coast Guard District, New Hampshire, National Bank Building.
CHARLESTON, S. C.—Captain of the port, Room 17, Customhouse.

Mariners are cordially invited to call at these offices, where they will be welcomed and afforded access to the latest hydrographic information.

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# 1943
# SUPPLEMENT
TO
# HYDROGRAPHIC OFFICE PUBLICATION No. 155
## BLACK SEA PILOT

Corrections and additions from Notices to Mariners
and other sources from date of publication
(September 18, 1926) to January 1, 1943

### WARNING

Due to wartime conditions, navigational aids may be removed, altered, or put out of operation without notice, and unannounced dangers may exist in coastal waters.

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1943

# SUPPLEMENT TO H. O. PUBLICATION NO. 155

## BLACK SEA PILOT

(Second edition, 1926)

NOTE.—(*a*) This supplement supersedes the 1942 supplement.

(*b*) It includes corrections and additions from Notices to Mariners and from other sources from the date of publication of this volume to January 1, 1943.

(*c*) New matter not included in the previous supplement is indicated by bold-faced type. Information from previous supplements which is still effective is printed in light-faced type.

(*d*) The omission of matter which appeared in the previous supplement is indicated by asterisks (* * *).

**Page 8.—After line 20 from bottom insert:**

"TURKISH NAMES.—A list of new Turkish names, with the old names used in this book and on the charts, is given below:

| New | Old | Lat. (N.) | | Long. (E.) | |
|---|---|---|---|---|---|
| | | ° | ′ | ° | ′ |
| Alci Tepe | Achi Baba | 40 | 06 | 26 | 16 |
| Bandirma | Panderma | 40 | 21 | 27 | 58 |
| Beykoz | Beikos | 41 | 08 | 29 | 05 |
| Bolayir | Bulair | 40 | 31 | 26 | 46 |
| Büyük'ada | Prinkipo | 40 | 52 | 29 | 08 |
| Büyükzekmece | Buyuk Chekmejeh | 40 | 58 | 28 | 34 |
| Canakkale | Chanaq | 40 | 09 | 26 | 24 |
| Darica | Deridja | 40 | 45 | 29 | 23 |
| Derince | Derinji | 40 | 45 | 29 | 49 |
| Ereğli | Bender Eregli | 41 | 18 | 31 | 27 |
| Eskihisar | Eski Hissar | 40 | 46 | 29 | 26 |
| Gelibolu | Gallipoli | 40 | 24 | 26 | 41 |
| Gereze | Gherze | 41 | 49 | 35 | 14 |
| Giresun | Kerasunda | 40 | 56 | 38 | 24 |
| Hegbeli'ada | Halki | 40 | 53 | 29 | 06 |
| Iğneada | Iniada | 41 | 52 | 28 | 01 |
| Ilyasbaba | Cape Helles | 40 | 03 | 26 | 11 |
| Inebolu | Ineboli (Niopoli) | 41 | 59 | 33 | 46 |
| Istanbul | Constantinople | 41 | 00 | 28 | 57 |
| Izmit | Ismid | 40 | 46 | 29 | 55 |
| Kozlu | Koslu | 41 | 27 | 31 | 46 |
| Midye | Midiah | 41 | 39 | 27 | 53 |
| Mudanya | Mudania | 40 | 22 | 28 | 53 |
| Pasa Limani | Pasha Liman | 40 | 29 | 27 | 36 |
| Rumeli Kavagi | Rumeli Kavak | 41 | 11 | 29 | 04 |
| Seddülbahir | Seddul Bahr | 40 | 03 | 26 | 12 |
| Sile | Kilia | 41 | 10 | 29 | 37 |
| Sinop | Sinub | 42 | 03 | 35 | 10 |
| Tarapya | Therapia | 41 | 08 | 29 | 03 |
| Tekirdap | Rodosto | 40 | 58 | 27 | 32 |
| Tirebolu | Tereboli | 41 | 01 | 38 | 49 |
| Trabzon | Trebizon | 41 | 01 | 39 | 46 |
| Ünye | Unie | 41 | 08 | 37 | 18 |
| Üsküdar | Skutari | 41 | 01 | 29 | 01 |
| Hesilköy | San Stefano | 40 | 57 | 28 | 50 |
| Zonguldak | Sungal Bay | 41 | 28 | 31 | 49 |

Page 15.—Lines 21 and 22, delete "No. 201 (Simultaneous Altitude and Azimuth of Celestial Bodies) or."

Line 23, before "offer" insert: "and No. 208 (Altitude and Azimuth)."

Page 28.—Delete the paragraph "PRATIQUE," lines 27 to 8 from bottom of page, and substitute:

"REGULATIONS FOR PASSAGE THROUGH THE DARDANELLES, SEA OF MARMARA, AND BOSPORUS.—The stations where vessels stop for the purposes of sanitary control are at Chanaq and Buyukdere (Buyak or Buyukliman).

"Under the Montreux Convention transit vessels entering the Straits pay sanitary dues for the inward or outward passage and if returning to the Straits, in transit, within a period of six months are not called upon to pay these charges a second time. On entering the Bosporus or Dardanelles on the return voyage the receipt for dues already paid must be produced in lieu of payment of a second charge.

"Vessels with a clean bill of health may, after examination at Chanaq, proceed direct to the Black Sea without further stoppage in the Straits.

"The following regulations are quoted from the Convention regarding the Régime of the Straits, Montreux, July 20, 1936:

" 'ARTICLE 2

" 'In time of peace, merchant vessels shall enjoy complete freedom of transit and navigation in the Straits, by day and by night, under any flag and with any kind of cargo, without any formalities except as provided in Article 3 below, No taxes or charges other than those authorized by Annex I* to the present Convention shall be levied by the Turkish authorities on these vessels when passing in transit without calling at a port in the Straits.

" 'In order to facilitate the collection of these taxes or charges merchant vessels passing through the Straits shall communicate to the officials at the stations referred to in Article 3 their names, nationality, tonnage, destination, and last port of call.

" '*Annex I refers to taxes and charges which may be levied for services rendered by sanitary control stations, lighthouses, and life saving services.

" 'ARTICLE 3

" 'All ships entering the Straits by the Ægean Sea or by the Black Sea shall stop at a sanitary station near the entrance to the Straits for the purposes of the sanitary control prescribed by Turkish law within the framework of international sanitary regulations. This control, in the case of ships possessing a clean bill of health or presenting a declaration of health testifying that they do not fall within the scope of the provisions of the second paragraph of the present article, shall be carried out by day and by night with all possible speed, and the vessels in question shall not be required to make any other stop during their passage through the Straits.

" 'Vessels which have on board cases of plague, cholera, yellow fever, exanthematic typhus, or smallpox, or which have had such cases on board during the previous seven days, and vessels which have left an infected port within less than five times twenty-four hours shall stop at the sanitary stations indicated in the preceding paragraph in order to embark such sanitary guards as the Turkish authorities may direct. No tax or charge shall be levied in respect of these sanitary guards, and they shall be disembarked at a sanitary station on departure from the Straits.

### " 'ARTICLE 4

" 'In time of war, Turkey not being belligerent, merchant vessels, under any flag or with any kind of cargo, shall enjoy freedom of transit and navigation in the Straits subject to the provisions of Articles 2 and 3.

### " 'ARTICLE 5

" 'In time of war, Turkey being belligerent, merchant vessels not belonging to a country at war with Turkey shall enjoy freedom of transit and navigation in the Straits on condition that they do not in any way assist the enemy.

" 'Such vessels shall enter the Straits by day and their transit shall be effected by the route which shall in each case be indicated by the Turkish authorities.

### " 'ARTICLE 6

" 'Should Turkey consider herself to be threatened with imminent danger of war, the provisions of Article 2 shall nevertheless continue to be applied except that vessels must enter the Straits by day and that their transit must be effected by the route which shall, in each case, be indicated by the Turkish authorities.

" 'The following regulations for the passage of naval vessels through the Dardanelles Sea of Marmara and the Bosporus have been promulgated by the Turkish Government:

" '1. The signal and radio stations at Seddul Bahir and Buyak (Buyukliman) at the entrance to the Dardanelles and the Bosporus, respectively, have been placed at the disposal of naval vessels and auxiliaries during their passage through the Straits for such communications as they may have to make in accordance with the Montreux Convention.

" '2. The commander of a foreign naval vessel or auxiliary which must pass through the Straits shall communicate at a distance of 50 miles from the entrance to the Straits by radio to the above-mentioned stations the exact complement of the forces under his command.

" '3. Foreign naval vessels and auxiliaries while passing through the Straits must signal their name by means of International signal flags as long as they are visible to the above-mentioned stations.

" '4. Foreign naval vessels and auxiliaries incurring damage while passing through the Straits shall immediately inform the above-mentioned stations by radio of their whereabouts (indicating latitude and longitude) and the nature of the damage.

" 'These vessels shall avail themselves of the above-mentioned stations in order to learn the course of action which will be designated to them by the Turkish authorities in accordance with the Montreux Convention.

" 'The following pilot stations shall take care of pilot services:

" 'The Dardanelles: Morto Bay and Gallipoli (Gelibolu).

" 'The Bosporus: Buyak (Buyukliman) Bay and Haidar Pasha (Hydarpasa).

" 'The following regulations are quoted from the Montreux Convention:

" 'In time of peace, light surface naval vessels and naval auxiliary vessels whether belonging to Black Sea or non-Black Sea powers, and whatever their flag, shall enjoy freedom of the Straits without taxes or charges whatever, provided that such transit is begun during daylight hours and subject to the conditions laid down in Article 13, which follows:

" 'The transit of vessels of war through the Straits shall be preceded by a notification given to the Turkish Government through the diplomatic channel. The normal period of notice shall be eight days; but it is desirable that in the case of non-Black Sea powers this period should be increased to fifteen days. The notification shall specify the destination, name, type, and tonnage of each unit, and number of the vessels, as also the date of entry for the outward passage, and, if necessary, for the return journey. Any change of date shall be subject to three days' notice.

" 'Entry into the Straits for the outward passage shall take place within a period of five days from the date given in the original notification. After the expiry of this period, a new notification shall be given under the same conditions as for the original notification.

" 'When effecting transit, the commander of the Naval force shall, without being under any obligation to stop, communicate to a signal station at the entrance to the Dardanelles or the Bosporus the exact composition of the force under his orders.' "

Before paragraph "PILOTS" insert:

"SPEED OF VESSELS.—In order to prevent damage to the coast line and to small craft, vessels must proceed at their slowest possible speed when within the following areas:

"In the Dardanelles, between a line drawn from Cape Helles to Kum Kale, and a line drawn from the town of Gallipoli to Chardak Burun.

"In the Bosporus, between a line drawn from Seraglio Point to Haidar Pasha, and a line drawn from Buyukdere to Umar Bay.

"DERATIZATION.—The following ports within the limits of this book are equipped to carry out the deratization of vessels and to issue Deratization Certificates and Deratization Exemption Certificates in accordance with article 28 of the International Sanitary Convention of 1926: Burgas, Varna Constantsa, Kavak, Ourla, Istanbul (Constantinople), Tribizond, Samsun, Sungal, Eregli, Odessa, Nikolaev, Sevastopol, Theodosia, Novorossisk, Batum, Tuapse, Poti, Khorli, Kerch, Mariupol, Rostov."

Page 29.—Lines 1–10 from bottom, delete "The pilot and" to end of page and substitute: "Pilotage is not compulsory for vessels passing through the Straits but is compulsory for all steamers entering Istanbul (Constantinople.) Pilotage is advisable for fully loaded vessels passing southward through the Bosporus at night, as the surface current settling out of the Black Sea is very strong.

The following pilot stations take care of pilot services:

"The Dardanelles: Morto Bay and Gallipoli (Gelibolu).

"The Bosporus: Buyak (Buyuk liman) Bay and Haider Pasha (Hydarpasa).

"The use of tugs is not compulsory except for a vessel going alongside a wharf at Istanbul.

"PROHIBITED ZONES IN TURKISH WATERS.—These zones include the shores of the Dardanelles and adjacent coasts at the western entrance; the greater part of the shores of the Gulf of Xeros, and islands therein; the islands of Imbros, Bozea Ali, as well as the group of Kucuk Tavsan (Rabbit) Islands in the western approach to the Dardanelles; the islands of Marmara, Pasa Liman, Ekinlik, Avsar (Afisia) and the group of neighboring islands in the Sea of Marmara; the shores of the Bosporus and adjacent coasts in the Sea of Marmara and Black Sea approaches.

"However, the private landings of the sanitary posts of Canakkale and Gelibolu which belong to the Sanitary Administration of the Littoral and the roads leading to these posts, as well as the private landing of the sanitary post of Manastir Agzi at Anadoly Kavak belonging to the Sanitary Administration of the littoral and the road which leads to it, are exempt from interdiction and are not subject to the stipulations relative to prohibited zones.

"The zones of towns and villages, such as those of Canakkale, Gelibolu and the islands which are situated within the limits of municipal jurisdictions and occupied by habitations, are considered outside of prohibited zones and foreigners are allowed to sojourn therein and exercise their professions in accordance with existing laws.

"The road to be followed to visit the ruins of Troy is the existing road of Canakkale-Sarical-Troy. Such visits must take place during the daytime and along this road."

Page 30.—Delete lines 1–4, inclusive.

After paragraph "Steering Rules" insert:

"Traffic Signals (U. S. S. R.) are as follows:

"1. Three balls, or three red lights, indicate that entry is strictly forbidden (for special occasions).

"2. A cone, point up, between two balls, or a white light between two red lights, indicate that entry is forbidden.

"3. Two cones, points together, over a ball, or a green light over a white light over a red light indicate that entry or leaving is forbidden.

"4. Two cones, points together, over a cone point down, or a white light between two green lights, indicate that leaving is forbidden."

"Regulations for Vessels Passing Dredgers in U. S. S. R. Waters.—The following regulations are in force for vessels passing dredgers in U. S. S. R. waters:

"1. Every steam or motor vessel when passing a dredger at work in the channels, narrows, anchorages, or off wharves and piers, must give sufficient warning of her approach by means of prolonged blasts on her whistle or fog horn and must pass such a dredger at the slowest possible speed.

"2. Vessels passing, or about to pass a dredger, are forbidden to overtake one another.

"3. No vessel passing a dredger is to tow astern a hawser or chain on the bottom or to have an anchor apeak.

"4. A dredger at work in any channel or fairway must show the following signals on the side on which work is proceeding and on which vessels must not pass:

By day.—A black ball over a red flag.

By night.—Two red vertical lights, visible for 1 mile.

"5. A dredger will show the signals mentioned in No. 4 on both sides, if there is no safe passage on either side of her.

"6. A dredger in any channel, fairway, or water in which there is no room to maneuver, and about to change her position, must, as soon as she begins to weigh her anchor, show the signals in No. 4 on both sides.

"7. A dredger, as soon as she gathers way after weighing, must haul down the above-mentioned signals and thereafter she is subject to the same regulations as any other vessel under way."

Page 32.—Lines 21–20 from bottom, for "Black Sea" read "northern entrance to the Kerch-Yenikale Strait and in the upper part of the Sea of Azov."

Lines 20 to 18 from bottom, delete "For" to end of paragraph and substitute "The limits of these areas are given in the body of this book."

After line 18 from bottom insert:

"Signal Denoting Submarine Operations.—When submarines are exercising or cruising in the territorial waters of the Union of Soviet Socialist Republics, vessels of war in attendance will fly a red, white, and blue pennant. These colors are > shaped with the bases to the mast; red as an outside border, then white, and a small blue triangle at the center of the hoist.

"When possible the attending vessel will transmit a radio warning on 600 meters.

"Vessels are cautioned to steer so as to give a wide berth to any vessel flying the above flag. If from any cause it is necessary to approach her, vessels should proceed at slow speed until the flag is lowered or instructions are give her as to a safe course to steer. A good lookout is to be kept meanwhile for submarines whose presence may be indicated only by their periscopes showing above water.

"It must not be inferred from the above that submarines exercise only when in company with escorting vessels.

"RUSSIAN EXAMINATION SERVICE.—There may be occasions when navigation is restricted, or prohibited, in U. S. S. R. territorial waters; should this be the case an examination service will be operated by special vessels, guardships, or coast-guard stations, which will show a distinguishing signal consisting of a blue triangular flag, by day, and three blue lights, disposed vertically, at night.

"Should navigation be absolutely prohibited, within a particular area, the examination vessel, guard ship, or coast-guard station will show, in addition to the above-mentioned distinguishing signal, three red balls, disposed vertically, by day, and three red lights in a similar position, at night."

Page 33.—Lines 17, 19, and 20, for "white" read "red."

After line 22 insert:

"URGENT SIGNALS FROM AIRCRAFT.—All aircraft, having a very urgent message to communicate to a vessel, concerning the safety of any aircraft, vessel, or person, within range of assistance, will fly low around the vessel, firing a succession of green pyrotechnic lights, or will flash a succession of green flashes with the daylight-signalling apparatus. The aircraft will then signal the message as prescribed in the International Code of Signals; or alight alongside the vessel; or, if unable to signal or alight, will fly towards the aircraft, vessel, or person in distress. When the green pyrotechnic lights are seen by the vessel, a boat is to be prepared for lowering.

"The signals from the aircraft are to be acknowledged by the vessel by flashing the answering sign, whether by day or at night, with the daylight signalling apparatus; if no such apparatus be carried, the answering pennant is to be hoisted close up, by day, and, at night, a white light is to be waived in a position away from other sources of light.

"If an aircraft is in difficulties which compel her to land, but is not in need of immediate assistance, she will fire a succession of white pyrotechnic lights, or, at night, if not in possession of pyrotechnic lights, she will make a succession of short flashes with her navigation lights.

"NONURGENT SIGNALS FROM AIRCRAFT.—An aircraft wishing to communicate with a vessel on a matter of no urgency will fly around the vessel to attract attention."

After paragraph "WARNING SIGNALS" insert:

"LIGHT VESSELS OFF STATION.—A light vessel of the U. S. S. R., not on her station, will not show her characteristic lights or sound her fog signals, but will, by day, hoist two large black balls (or red flags), one forward and the other aft, and, by night, show two red lights, one forward and the other aft. Her characteristic daymarks will, if possible, be lowered.

"By day the vessel will also hoist the International Code signal 'QE,' signifying 'I am not on my station'; at night it will show a red and white flare simultaneously at least every 15 minutes, or will show a red light and a white light simultaneously."

Page 34.—Delete lines 5 to 20 and substitute:

### SECTION I

"GALE WARNING SIGNALS. (Force 8, Beaufort Scale.)

"1. A black cone, point up, or two red lights (vertical) indicates a northwesterly gale is expected.

"2. A black cone, point down, or two white lights (vertical) indicates a southwesterly gale is expected.

"3. Two black cones, points up, a red light above a white light, indicates a northeasterly gale is expected.

"4. Two black cones, points down, or a white light above a red light, indicates a southeasterly gale is expected.

"5. A black ball or a red light indicates wind of force 6 to 7 expected.

"6a. Two black balls (vertical) or two red lights (horizontal) indicates heavy squall expected.

"6b. Black cross indicates a hurricane is expected.

"7. A black flag or black cylinder indicates wind expected to veer.

"8. Two black flags or cones (vertical) indicates wind expected to back.

"Signals 7 and 8 are hoisted only in conjunction with signals 1 to 4 and alongside them.

"Signals 5, 6a, and 6b are hoisted at the masthead; the other signals hoisted at the yardarms."

### SECTION II

"The following signals will be made as warnings of wind of force 6 to 7, or above:

"9. A black 'T' shape, hoisted upside down, or a triangle of 3 red lights, apex upwards, indicates that strong northwesterly winds are expected.

"10. A black 'T' shape, hoisted upright, or a triangle of 3 red lights, base upwards, indicates that strong southwesterly winds are expected.

"11. Two black 'T' shapes, disposed vertically, both upside down, or one red light above the apex of a triangle of 3 red lights, apex upwards, indicates that strong northeasterly winds are expected.

"12. Two black 'T' shapes, disposed vertically, both upright, or one red light below the apex of a triangle of 3 red lights, base upwards, indicates that strong southeasterly winds are expected.

"13. Two black 'T' shapes, disposed vertically, the upper one upside down, or a diamond shape consisting of 4 red lights, indicates squally weather.

"NOTE.—Should the wind be expected to freshen to a force of 8 or above, signals 9 to 12 will be replaced by signals 1 to 4 of Section I; and signal 13 by signal 6a of Section I.

"Signals 7 and 8 of Section I may be accompanied, in case of necessity, by signals 9 to 12.

"Signals 9 to 13 are hoisted at the yardarm."

### SECTION III

"In order to give an approximate idea of the time of arrival of the weather indicated by signals 1 to 6b and 9 to 13, the following day signals will be hoisted with them:

"14. Three black rectangular shapes (major axis horizontal), disposed vertically, indicates that the predicted weather is expected to arrive the day after tomorrow.

"15. Two black rectangular shapes (major axis horizontal), disposed vertically, indicates that the predicted weather is expected to arrive tomorrow.

"16. One black rectangular shape, hoisted horizontally, indicates that the predicted weather is expected today.

"NOTE.—Signals 14 to 16 will only accompany signals 1 to 6b or 9 to 13; the absence of a time signal from any one of these signals indicates that the predicted weather is expected within the ensuing 48 hours and that no nearer approximation can yet be made.

"As soon as the commencement can be predicted with greater accuracy, the appropriate time signal will be hoisted.

"Signals 14 to 10 are displayed at the yard alongside signals 1 to 4 or 9 to 13, but nearest the mast."

After line 26 insert:

"TURKISH STORM SIGNALS.—The day signals and night signals Nos. 1 to 4 are similar to the U. S. S. R. storm signals.

"A black ball by day or a red light by night indicates a gale of hurricane force."

Page 45.—Before paragraph "CURRENTS" *insert*:

"WATER LEVEL SIGNALS (U. S. S. R.):

"1. A cone, point down, or a green light, indicates a rise of 0.2 meter (7.9 inches).

"2. A black cylinder or a red light indicates a rise of 1 meter (3.3 feet).

"3. A black ball or a white light indicates a rise of 5 meters (16.4 feet).

"4. A white cylinder or a red light indicates a rise of 0.1 meter (3.9 inches).

"These signals, hoisted in groups or separately, indicate the total rise of the water level. The back cylinder is hoisted farthest to the right, the cone and ball next to the left, and the white cylinder farthest to the left or below the cone and ball; the respective lights are hoisted in the same order."

Page 65.—To last two columns of signal VI add "or cast off tow rope" and "The tow rope is cast off," respectively.

Delete signals VII, VIII, and IX and substitute:

| | | | |
|---|---|---|---|
| VII | Long, short, long and short blasts. | Go ahead, follow channel. | I am going ahead, following channel. |
| VIII | A short and three long blasts. | Shorten the interval | I am shortening the interval. |
| IX | Three long blasts | Proceed on your voyage | I am proceeding to my destination. |
| X | Short, long, and short blast. | Listen in on radio | I am listening in on radio. |
| XI | Long, two short, and a long blast. | Attention; look out for signals. | Attention; I am looking out for signals. |
| XII | Short, two long, and a short blast. | Anchor | I am anchoring. |
| XIII | Several long blasts | Suspension of work until the morning or more favorable conditions. If stopped, pending recommencement of work, "stand by." | I am carrying out the order. |

Page 66.—After line 23 insert:

"Caution Regarding Speed of Vessels.—The following notice, concerning speed of vessels passing through the Dardanelles has been issued by the Turkish Government:

"In view of the fact that waves caused by the excessive speed of vessels cause damage to coastal installations and small craft, it has been decided that vessels should reduce their speed to the minimum in case they are obliged to pass in proximity to the coast in the following zones:

"From Gehbolu to Cardak and from Helles to Kum Kale. Vessels should refrain from exceeding 10 miles per hour when in the zone in the Dardanelles comprised within lines drawn from:

"Nara to the Bokali lighthouse and to the Kephez lighthouse."

Page 67.—Line 4, after "white light" insert "with red sector."

Line 5, after "miles" insert "in the white sector and 12 miles in the red sector."

Page 68.—After line 5 insert:

"Light.—A light is exhibited from a white concrete tower situated on the eastern part of the rocky bank which fringes the western side of Morto Bay. (See Light List.)"

Line 7 from bottom, for "green" and "30 feet (9.1 m.)" read "red" and "51 feet."

Page 69.—Line 10 from bottom, for "red light, 36 feet (11.0 m.)" read "white light, 39 feet."

Line 9 from bottom, for "4" read "10."

Page 70.—Line 2 from bottom, for "red" read "white."

Page 71.—After line 9 insert:

"Prohibited Anchorage.—Owing to the existence of submarine cables, anchorage is prohibited within the area westward and northward of Kephez Point Light, as indicated by dashed lines on the chart."

To paragraph "Wrecks" add:

"A wreck with a least depth of 1½ fathoms over it lies sunk 900 yards 215°30′ from Kephez Point Light."

Page 73.—Delete paragraph "Pier."

Line 19 from bottom, for "green" read "red."

Page 74.—After line 3 insert:

"Light.—A light is exhibited from a white concrete tower situated on the shore bank at Sestos Point. (See Light List.)"

Page 75.—Line 3, for "green" read "red."

Line 18, for "red" read "green."

Page 76.—After paragraph "Repairs" insert: There is a floating crane of 100 tons capacity at Nagara Kalessi."

Page 78.—Lines 9 to 11, delete "at the" through "lighthouse."

Delete lines 16 to 21 and substitute:

"LIGHT.—A light is exhibited from a sandy shoal close westward of Nagara Kalessi. (See Light List.)"

After paragraph "NAGARA SPIT" insert:

"PROHIBITED ANCHORAGE.—Owing to submarine cables anchorage is prohibited in the area enclosed by dashed lines, as shown on the chart, northward of the light."

Delete lines 12 to 10 from bottom.

Lines 8 to 6 from bottom, delete "and past" to end of paragraph.

Line 4 from bottom, for "1,150 yards 193°" read "0.58 mile 176°."

To line 3 from bottom add "A green buoy, marked 'W,' also marks this danger.'

Page 81.—Line 14 from bottom, for "red" read "white."

Page 82.—After paragraph "GALATA BURNU" insert:

"LIGHT.—A light is shown from a small concrete tower on the shoal off Galata Burnu. (See Light List.)"

Page 85.—Line 4 from bottom, for "red" read "green."

Page 86.—Delete lines 15 and 14 from bottom and substitute:

"LIGHT BUOY.—A light buoy showing a flashing white."

Page 87.—To line 21 add: "The new lighthouse at Cape Helles in range about 65° with the war memorial on the hill back of it leads about 2½ miles northwest of Mansell Shoal."

Page 91.—Before paragraph "DOHAN ASLAN BANK" insert:

"A LIGHT is shown on Dohan Aslan Burnu. (See Light List.)"

To paragraph "OBSTRUCTION" add "It is marked by a green buoy."

Delete paragraph "LIGHT BUOY."

Line 3 from bottom, for "BUOY" read "BUOYS."

To bottom of page add:

"A buoy is moored in 4¼ fathoms about ¾ mile southward of Dohan Aslan Burnu."

Page 92.—Lines 3 and 4, for "light buoys" read "buoys."

Lines 8 and 7 from bottom, for "red and white in horizontal bands" read "white."

Line 6 from bottom for "white" read "red."

Before paragraph "ANCHORAGE" insert:

"An obstruction lies 2½ miles southward of Inje Burnu."

Page 93.—Delete paragraph "WRECKS" and substitute:

"WRECK.—A wreck lies close southwestward of the pier at Sharköi. It is marked by a green buoy with 'W' painted on it."

Page 95.—Delete paragraphs "WRECK" and "RODOSTO LIGHT."
Delete paragraph "JETTY" and substitute:
"PIER.—There is an iron landing pier 600 feet long with a depth of 15 feet at its head."

Page 96.—To paragraph "EREGLI BAY" add:
"A black conical buoy marks the outer end of this mole."
Line 14 from bottom, for "fixed" read "flashing" and for "164" read "173."
Line 13 from bottom, delete "(50.0 m.)."

Page 100.—Line 21, for "fixed and" read "group."
After line 24 insert:
"FOG SIGNAL.—A fog signal is made on a siren."

Page 101.—Delete line 1.
After line 11 from bottom insert:
"CABLE.—A power cable extends across the strait between Old Seraglio Point and Kiss Kalessi. The shore ends are marked by black and white boards which are illuminated at night."
Delete lines 5–3 from bottom.

Page 102.—Delete lines 10 to 12.

Page 105.—Before paragraph "KARABIGHA" insert:
"LIGHT.—A fixed red electric light, visible 1½ miles, is shown from the largest pier."

Page 106.—Delete paragraph "PIER," and substitute:
"PIERS.—There are three wooden piers. Two of these are about 50 feet long and are used by lighters. The third is 200 feet long, has 13 feet alongside, and is used by small sailing lighters.
"SUPPLIES.—Meat can be obtained and small quantities of vegetables."

Page 109.—Delete line 16 and substitute "distant about 300 yards."

Page 110.—Line 7, for "131" read "125."
Line 8, delete "(39.9 m.)."

Page 116.—After line 21 from bottom insert:
"A FOG SIGNAL is sounded at the light station. (See Light List.)"

Page 117.—Delete paragraph "BUOY."

Page 118.—Line 4 from bottom, delete "occulting white" and for "131 feet (39.9 m.)" read "141 feet."

Page 120.—Line 1, for "flashing" read "fixed."
Delete lines 3 and 4.
After line 16 insert:
"PILOT.—A pilot or someone with local knowledge indicates the berth to be taken."

Page 125.—Delete paragraph "MUDANIA LIGHT."
Line 20, for "24 feet (7.3 m.)" read "from 14 to 25 feet."
Lines 22 and 23, delete "A new pier" to end of sentence.

Page 127.—Before paragraph "ANCHORAGE" insert:
"A LIGHT is shown from the outer end of the pier at Samanli Chiflick, about 1 mile west of Yalova. (See Light List.)"

Pages 128 and 129.—Delete paragraphs "TRAFFIC REGULATIONS" and substitute

"TRAFFIC REGULATIONS.—Vessels are prohibited from entering the Gulf of Izmid without the previous sanction of the Turkish Government. When the above sanction has been received, the following regulations are to be observed:

"Vessels must stop off Deridja to embark a Turkish official before proceeding into and to disembark him before leaving the gulf, and must at all times act according to the signals displayed at the signal station there. They are prohibited from entering the gulf between sunset and sunrise, but may leave the gulf at any time provided six hours' notice has been given to Deridja Burnu.

"Vessels are advised to obtain a pilot at Istanbul or Chanak before entering the gulf.

"PROHIBITED ANCHORAGE.—Anchorage is prohibited in the gulf in the area which is bounded on the west by a line drawn in a 16° direction from Dil Burnu to the opposite shore and on the east by a line drawn from a point 13 miles 166° from Dil Burnu in a 21° direction to the opposite shore.

"Pilotage is free."

Page 129.—To paragraph "ANCHORAGE" add:
"A rocky bank, with a least depth of 12 fathoms, lies about 1½ miles north-northeastward of Topche Iskalesi."
After paragraph "DIL BURNU" insert:
"A provisional light is shown at Dil Burnu. (See Light List)."

Page 130.—Before paragraph "COAST" insert:
"A WRECK, with a least depth of 4 fathoms over the mastheads, lies ¾ mile 47° from Dil Burnu Light. It is marked by a buoy."

Page 131.—Before paragraph "IZMID" insert:
"A WRECK, over which there is a depth of 4 fathoms, lies 740 yards 222° from the clock tower."

Page 132.—To line 13 add:
"A buoy marks the outer end of this bank."

Page 136.—To line 10 from bottom add: "A wreck with a depth of 4½ fathoms over it exists 700 yards 229° from the minaret of Maltepe."

Page 138.—After line 15 insert:

"Fog Signal.—A fog signal is made on a siren at Fanar Burnu."

After paragraph "Hereke Tash" insert:

"Light.—A quick flashing red light is shown on Hereke Tash. (See Light List.)"

Line 20, delete "Buoy."

Line 21, delete "A small red buoy marks the wreck."

Page 139.—Delete lines 18 to 20.

Delete lines 16 to 13 from bottom.

Page 140.—Line 5, for "330 yards" read "about 600 yards."

Line 7, for "2,400" read "2,000."

Line 9, for "22 feet (6.7 m.)" read "25 feet."

Page 141.—After line 19 insert:

"Prohibited Anchorage.—Anchorage is prohibited within a distance of 200 yards on either side of the cables extending from Prinkipo.

"Their location is indicated on the chart and marked on shore by black beacons with white anchors."

Page 142.—After line 8 from bottom insert:

"A Light is exhibited on the eastern side of the island. (See Light List.)"

Page 146.—Before paragraph "Approach" insert:

"For general regulations with regard to vessels preceding to Istanbul from either the Dardanelles or the Bosphorus, see page 28.

"Caution Regarding Speed of Vessels.—The following notice, concerning speed of vessels passing through the Bosporus has been issued by the Turkish Government:

"In view of the fact that waves caused by the excessive speed of vessels cause damage to coastal installations and small craft, it has been decided that vessels should reduce their speed to the minimum in case they are obliged to pass in proximity to the coast in the zone comprised within lines drawn from Buyukdere to Umumyeri and from Ahirkapi to Haydarpasa."

After line 3 from bottom insert:

"Fog Signal.—A fog signal is made on a siren at Istanbul Light."

Page 147.—Line 6, after "port" insert "known as Port of Galata."

Line 8, for "Tophane Arsenal" read "Cabatash Landing."

Line 9, delete "a distance of about 1,800 yards."

Lines 13 to 17, delete from "The principal" to end of paragraph.

Delete lines 20 and 21.

Lines 18 to 15 from bottom, delete from "The depths" to end of paragraph and substitute: "The port has enough depth to accommodate vessels of the largest size, and the quays on each side of the harbor have a depth of 26 feet alongside."

After line 8 from bottom insert:

Note.—The inner commercial port and the naval port combined are now known as the inner port. The Bosporus and its southern approach is known as the outer port."

Page 148.—After paragraph "PRATIQUE" insert:

"ANCHORAGE.—Vessels must obtain authorization from the captain of the port before anchoring anywhere in the port except in the following localities:

"(*a*) Southward of a line joining Old Seraglio Point and Leander Tower.

"(*b*) Between a line joining Rumili and Anatoli Lighthouses and a line joining Yenikol Light Buoy and Pasha Bagtche.

"Vessels loaded with inflammables or explosives must not anchor northward of a line joining the light on the northwestern extremity of Haidar Pasha Breakwater and Seraglio Point Light.

"SPECIAL ANCHORAGE.—Vessels passing through the port finding it necessary to stop for provisions or repairs to machinery or on account of bad weather should anchor in either of these areas:

"AREA T.—From Leander Tower in a 320° direction to the shore at Funduki Palace, thence in a 61° direction to Orta Kioi Mosque, and thence in a 213° direction to Leander Tower.

"Area TT.—From Leander Tower 400 yards 270°, thence 2,340 yards 180°, thence 450 yards 112°, and thence in a 0° direction to Leander Tower.

"LIMITS OF PORT.—The limits of the port of Istanbul (Constantinople) are as follows:

"North Limit.—From Rumili Light in a 118° direction to Anatoli Light.

"South Limit.—From a point 1.1 miles 264° from Stefano Point Light 15.9 miles 118° and thence in 63° direction to the Asiatic shore."

After paragraph "PILOTS" insert:

"The flag flown by the pilot craft has one white and one red horizontal stripe with a yellow anchor."

Page 149.—Delete paragraph "QUAYS" and substitute:

"QUAYS.—In Galeta Harbor, there are the following principal wharves: Galeta with 2,400 feet of berthing space and a depth of 25 feet alongside; Sirkeci with 1,100 feet of berthing space and a depth of 25 feet alongside; and Tophane, 984 feet long with a depth of 24 feet alongside.

"There are a number of tugs and more than 800 lighters of 25–100 ton capacity available. The quays are serviced by cranes of from 1½ to 6 tons capacity."

"REPAIRS.—Minor repairs may be undertaken. There are three floating cranes of 60–70 tons capacity."

Before paragraph "Supplies" insert:

"SALVAGE.—There are three salvage companies operating from this port; there are several salvage boats."

Line 17 from bottom, delete "In normal times about 15,000 tons of coal was" and substitute "About 5,000 tons of Turkish coal is usually."

Line 14 from bottom, for "300" read "200".

Delete lines 12 and 11 from bottom and substitute:

"The fuel oil wharf is at Selvi Burnu. (See pages 159–160.)

"It was reported (1942) that no fuel oil or Diesel oil is available."

Lines 10 and 9 from bottom, delete "at a maximum rate of 2,000 tons in 24 hours" and substitute "and by pipe line."

Page 150.—Delete lines 14 to 10 from bottom and substitute:

"WRECK.—A wreck with a depth of 11 fathoms over it lies in anchorage Area T about 1,500 yards 3° from Leander Tower."

Page 152.—Line 14 from bottom, for "36 feet (11 m.)" read "26 feet."

Page 153.—Line 18 for "white" read "black."
Line 20 after "Bank" insert "The buoy has a conical top mark."

Page 154.—Lines 14 and 15 from bottom, for "only by sailing vessels" read "by all vessels entering the Bosphorus from the Black Sea."

After line 14 from bottom insert:

"QUARANTINE ANCHORAGE.—Areas A and B, indicated on the chart by dashed lines, are quarantine anchorages for large and small vessels, respectively."

Page 155.—After paragraph "RUMELI KAVAK" insert:
"PILOTS can be obtained here."

Page 156.—After line 24 insert:
"Storm signals are shown from the port office."

Page 157.—Line 4, for "fixed" read "group flashing."

After line 7 insert:

"RADIOBEACON.—A radiobeacon is located near Cape Rumili (Rumeli) Lighthouse. (See H. O. Pub. No. 205, Radio Navigational Aids.)"

Line 16, for "red" read "white."

Page 159.—After paragraph "ANCHORAGE" insert:

"A SUBMARINE CABLE crosses the Strait between a point about ¾ mile northwestward of Yeni Kioi to Selvi Burnu. The landing places of this cable are each marked by a beacon."

Page 160.—To line 2 add: "A vessel drawing up to 30 feet can be accommodated. There is one oil barge."

Line 7 from bottom, for "white" read "red" and for "globe" read "cylindrical top mark."

Page 161.—Lines 17 to 16 from bottom, for "black flat-topped" read "red conical."

**After line 9 from bottom insert:**

**"PROHIBITED AUCHORAGE.—Anchorage is prohibited in an area between a line extending from Madshiar Bank to Telli Point and a line extending from Kavak Point Light to Dikili Rocks. A cable lies between Rumeli Kavak and Anatoli Kavak."**

Delete paragraph "THE HEALTH OFFICE" and "PILOTS."

Page 162.—Line 2, for "62 feet (18.9 m.)" read "52 feet."
Line 26, for "An alternating fixed and" read "A."
Line 27, delete "red and."
After line 14 from bottom insert:

"TRAFFIC REGULATIONS.—Vessels passing through the Bosporus must keep to the left side of the channel."

Page 167.—Line 3 from bottom, for "19" read "6."

Lines 1 and 2 from bottom, delete "The principal" through "washed."

Bottom line, for "18" read "5."

Page 168.—Lines 1 and 2, delete "The rocket" through "ends."

To line 3 add: "Beginning at the Bosporus the stations on the European side are numbered with odd numbers from 1 to 13, and those on the Asiatic side with even numbers from 2 to 16. The numbers are painted on the station in figures 10 feet high, black on the Asiatic side and white on the European side."

Line 4, for "Kilios, about 3" read "Atlama, about 1."

Line 7, delete "being rarely more than 2 miles apart."

Lines 11 to 14, delete "being about" to end of paragraph.

Page 170.—Delete lines 18 to 22 and substitute:

"LIGHT AND BELL BUOY.—A light and bell buoy showing a flashing white light is moored 11.2 miles 15° from Rumeli (Rumili) Lighthouse."

Lines 21 and 22 from bottom, delete "westward of which there is a rocket house."

Page 172.—Lines 1 and 2, delete "There is a rocket house here."

Lines 13 to 15, delete "about ¾ mile" to end of paragraph and substitute "and refuge station at Hissar Kayassi."

Line 21, delete "and there is a rocket house about 2 miles westward of it."

Line 19 from bottom, delete the first sentence and substitute: "Kunduz has a rocket house."

Lines 17 and 18 from bottom, delete "at the latter" to end of paragraph.

Line 10 from bottom, delete "and has a rocket house."

Page 173.—Line 12, delete "where there is a rocket house."

Page 174.—Lines 10 and 11, delete, "At Derkos" to end of sentence.

Lines 13 and 14, delete "and at" to end of paragraph and substitute "and a refuge station."

Page 176.—Line 15 from bottom, after "shingle" insert: "A breakwater extending in a northerly direction affords some shelter for vessels not having a draft of more than 16 feet. There is a quay, which has a frontage of about 300 feet."

After paragraph "Anchorage" insert:

"LIGHT.—A light is shown from a stone tower at Akhtebolu (Akhtapol). (See Light List.)"

Line 8 from bottom, insert "(now called Tzarevo)."

Line 7 from bottom, after "Vasiliko" insert: "is protected by a breakwater and."

Page 177.—After line 12 insert:

"A light is shown from a stone tower at Vasiliko. (See Light List.)"

Page 178.—After line 18 insert:

"LIGHT.—A light is exhibited from a stone tower on Cape Zeitin, and a fog signal is made. (See Light List.)"

Page 179.—To bottom of page add:

"A FOG SIREN is sounded at the light station. (See Light List.)"

Page 180.—After paragraph "WRECK" insert:

"LIGHT.—A light is shown from a stone tower 1.03 miles 191° from Megalo Nisi Light. (See Light List.)"

Lines 5 to 7, delete "north-" through "which" and substitute "southwestward and."

Lines 9 to 11, delete "This port" through "them."

Page 181.—Line 15, delete "fixed white."

Line 16, for "11 miles" read "6 miles."

Page 182.—After paragraph "BURGAS SHOALS" insert:

"A black spar buoy with upturned broom top mark is moored 1.5 miles 78° from the outer end of Burgas Breakwater."

Delete paragraph "BUOY."

Line 6 from bottom, after "Point" insert "on which are several oil tanks."

Bottom line, for "25 feet (7.6 m.)" read "23½ feet."

Page 183.—To line 2 add: "The harbor was (1929) reported to have shoaled to 22 feet (6.9 m.)."

Line 3, for "fixed" read "flashing."

Line 9, for "red" read "green."

Line 13, for "bell" read "siren."

Before paragraph "PILOTS" insert:

"BUOYS.—Two buoys with red spherical top marks are moored on the western side of the dredged area.

"Two mooring buoys used by the Standard Oil Co.'s vessels are located about 200 yards apart in the southern part of the harbor.

"There are hauling-off buoys in the northeastern part of the harbor."

Line 15, for "is not" read "is."

Lines 20–21, for "There are cranes lifting up to 6 tons" read "There are two cranes, one of 7 tons and the other of 12 tons capacity, and there is a floating crane of 40 tons capacity which is sometimes moved to Varna. Vessels ordinarily use their own cargo handling appliances."

Line 22 from bottom, delete from "The Turkish" to end of line and substitute "Steamers."

Line 19 from bottom, for "32" read "120."

Page 184.—Line 2, delete "Ahillo minaret, on with."

After line 4 insert:

"LIGHT AND WHISTLE BUOY.—A red light and whistle buoy, showing a group flashing white light, is moored in a depth of 5 fathoms close southeastward of Stavro Rock."

After line 14 insert:

"A LIGHT BUOY is moored eastward of Crescent Shoal."

Line 18, delete "The mosque" through "conspicuous" and substitute: "There are two conspicuous buildings, a Byzantine church situated at the eastern extremity of the peninsula and a four-storied building situated about 1 mile northwestward of the town."

After line 24 insert:

"LIGHT.—A light is exhibited from a masonry tower on southeast Ankhelu (Southeast Ahillo) Reef."

Page 185.—After paragraph, "MISSEVRIYA (MESSEMVRIYA)" insert:

"LIGHT.—A light is shown from a stone tower 440 yards 223° from Missevriya church. (See Light List.)"

Page 186.—Line 18, for "207 feet (63.1 m.)" read "204 feet."

Page 187.—At top of page insert:

"LIGHT.—A light is shown from a stone tower 19¾ miles southward of Cape Galata Light. (See Light List.)"

Page 188.—After paragraph "GALATA BURNU LIGHT" insert:

"FOG SIGNAL.—A nautophone is sounded."

After paragraph "ANCHORAGE" insert:

"Fishing nets with stakes are occasionally laid out eastward of the breakwater a distance of 300 yards."

Page 189.—Lines 1 and 2, for "4 fathoms (7.3 m.)" read "25 feet, and the northern and eastern quays have the same depth alongside."

Line 14, add "The depth in the canal is reported (1932) to have decreased. Its entrance is protected by two jetties, the southern of which extends under water for 300 yards."

Line 15, for "An occulting" read "A flashing."

Line 17, for "red" read "green."

Line 20, for "green" read "red.' '

After line 21 insert:

"FOG SIGNAL.—A nautophone is sounded from the southern extremity of the east breakwater."

Lines 21 and 20 from bottom, delete from "It has" to end of paragraph and substitute "There is a 10-ton crane on the quay and a floating crane with a capacity of 40 tons."

Line 17 from bottom, delete "A small supply of coal is usually available" and substitute "No stocks of coal or fuel oil are maintained for bunkering purposes."

Line 16 from bottom, delete "by water boat or."

Line 9 from bottom, delete "This station handles commercial messages."

Page 191.—Line 2, after "bottom" insert: "There is a small pier, for the use of lighters, with a depth of 8 feet at its outer end."

After line 4 insert:

"LIGHT—BREAKWATER UNDER CONSTRUCTION.—A flashing green light marks the work in progress on a breakwater which is now (1938) being constructed at Balcic Anchorage."

To line 20 add "There is a small pier in Kavarna Bay for the use of lighters, with a depth of 8 feet at its outer end."

Line 8 from bottom, for "164 feet (50 m.)" read "220 feet."

Line 7 from bottom, for "18" read "21."

After line 5 from bottom insert:

"RADIOBEACON.—A radiobeacon is located near the light. (See H. O. Pub. No. 205, Radio Navigational Aids.)"

Page 192.—Line 5, for "Shableh" read "Tuzla."

Line 6, for "in this vicinity" read "between Cape Caliacra and Cape Shableh."

Line 16, for "fixed" read "group flashing" and for "98 feet (29.9 m.)" read "118 feet."

Line 17, delete "white" and after "tower" insert "98 feet high and painted in broad red and white bands."

Line 22, for "1½ fathoms (2.7 m.)" read "1¼ fathoms."

Line 23, for "nearly a" read "about ½."

To line 24 add "A depth of 5 fathoms lies about 1½ miles offshore abreast of Ilanlik."

Lines 11 and 10 from bottom, delete "The greatest" to end of sentence, and substitute:

"Where, in 1939, there were depths of 3 to 12 feet."

Page 193.—Line 9, for "fixed white" read "flashing red" and delete "50 feet" through "sea."

Line 10, for "10" read "12" and after "tower" read "with red bands, 26 feet high."

Line 12, for "Two fixed red lights, 28 and " read "A flashing green light."

Line 13, for "are" read "is," for "white' 'read "green," and after "cabin" insert "16 feet high."

Line 21, for "206 feet (62.8 m.)" read "203 feet."

Line 22, for "framework" read "tower, 144 feet high."

Line 23, for "a central column" read "black horizontal bands."

After line 20 from bottom insert:

"The lighthouse is used as a lookout station and is in telephonic communication with Constantsa."

Page 194.—Before paragraph "THE HARBOR" insert:

"MOORING.—Three mooring buoys for the use of naval vessels have been placed in the approach to Constantsa Harbor eastward of the breakwater."

Lines 18 to 20, delete "The entrance" to end of sentence and substitute: "The outer harbor has been dredged to 5 fathoms."

Lines 21–25, delete "Two moles" through "built," and substitute:

"Three moles project from the western side of the harbor forming three basins, of which the southern, located between the southern breakwater and the southern mole, is the Petroleum Basin, and the central is the New Petroleum Basin."

Line 12 from bottom, for "occulting" read "flashing."

Line 11 from bottom, delete "gray" and after "tower" insert "painted in broad black and white bands."

Line 8 from bottom, for "An occulting" read "A fixed."

Line 6 from bottom, for "an occulting" read "a flashing."

Line 2 from bottom, for "siren" and "western" read "nautophone" and "eastern."

Line 1 from bottom, delete "(reported irregular.)"

At bottom of page add:

"RADIOBEACON.—There is a radiobeacon at Constantsa. (See H. O. Pub. No. 205, Radio Navigational Aids.)"

Page 195.—Line 1, for "A red" read "A light and" and after "buoy" insert: "painted with black and white checkers and showing a group flashing white light."

Delete lines 4 to 10, inclusive.

To paragraph "Lifeboat" add:

"Two motor lifeboats are also maintained at Constantsa."

To paragraph "Pilots" add "A pilot is always on duty at the harbor master's office except between 12:30 p. m. and 3 p. m. and will come out in a tug and meet the vessel about ¼ mile off the entrance, unless prevented by bad weather.

"The regulations of the port and the customs requirements are very strictly enforced."

Lines 23 and 22 from bottom, for "must anchor 1 mile distant from the harbor and" read "should anchor within 1 mile of the harbor and in such a position as not to interfere with vessels entering and leaving. If other vessels are awaiting entry the International Code flags indicating the number of the order of arrival should be hoisted and the vessel should."

Line 8 from bottom, for "248,000 tons" read "600,000 tons (1926)."

Line 2 from bottom, for "quay in the northeastern side of the" read "mole forming the southern side of the northern."

Page 196.—Delete line 1 and substitute:

"Tugs.—Several tugs, one of 500 H. P., are available."

After line 3 insert:

"A Floating Dock, of 8,000-tons capacity, can accommodate vessels up to 492 feet in length, 75½ feet beam, and 21 feet draft."

Line 9 for "1,500" read "500."

To paragraph "Radio" add "Weather bulletins are sent out. (See H. O. Pub. 205, Radio Navigational Aids, and H. O. Pub. 206, Radio Weather Aids to Navigation.)"

Line 19, before "hospital," insert "civil and a military."

Delete paragraph "Pratique."

Page 200.—Lines 8 and 9 delete "From" through "maintained" and substitute: "From October 15, 1933, to November 30, 1934, the least depth in the river between Braila and Sulina varied from 23 to 24 feet."

Page 203.—Lines 7–8, for "black wooden" read "white."

Line 8, after "tower" insert "with a green dome."

Page 204.—Before paragraph "Depth on Bar" insert:

"Caution.—Mariners are cautioned that moored mines exist in the approaches to Sulina in the areas enclosed by lines joining the following positions:

"1. Eastward of Sulina:

| | | ° | ′ | ″ | | | ° | ′ | ″ | |
|---|---|---|---|---|---|---|---|---|---|---|
| (*a*) | Lat. | 45 | 11 | 30 | N., | long. | 29 | 52 | 00 | E. |
| (*b*) | Lat. | 45 | 34 | 00 | N., | long. | 29 | 50 | 30 | E. |
| (*c*) | Lat. | 45 | 37 | 00 | N., | long. | 29 | 55 | 30 | E. |
| (*d*) | Lat. | 45 | 37 | 30 | N., | long. | 30 | 00 | 00 | E. |
| (*e*) | Lat. | 45 | 37 | 30 | N., | long. | 30 | 07 | 00 | E. |
| (*f*) | Lat. | 45 | 17 | 30 | N., | long. | 30 | 17 | 00 | E. |

"Southeastward of Burnas:

° ′ ″ ° ′ ″

(*a*) Lat. 45 46 00 N., long. 30 07 00 E.
(*b*) Lat. 45 53 00 N., long. 30 27 15 E.
(*c*) Lat. 45 51 00 N., long. 30 28 45 E.
(*d*) Lat. 45 44 00 N., long. 30 09 15 E."

Lines 23 to 21 from bottom, delete "In July 1925," to end of sentence and substitute: "In 1932 the general depths on the bar was 23 to 24 feet, and the least depths 19 to 21 feet. Endeavor is made to maintain a least depth of 22 feet so as to always admit vessels drawing 21 feet."

Delete lines 11 to 1 from bottom, and substitute:

"A flashing white light elevated 47 feet and visible 10 miles is shown from a square iron framework tower on the outer end of the new South Pier.

"A flashing red light, 40 feet above the water and visible 8 miles, is exhibited from a white iron framework tower with a black base on the head of the north mole."

Page 205.—Lines 1 and 2, delete "near the occulting green light."

Line 2 and 3, delete "near the fixed red light."

Line 5, for "white" read "green."

Delete lines 8 to 13.

Line 14, for "stakes" read "spar buoys."

Delete paragraph "RANGE BEACONS" and substitute:

"RANGE BEACONS.—Two range beacons in line bearing 295° lead up to the entrance: The front beacon is located on the north jetty and the rear beacon is situated about 400 yards from the front beacon.

"A black beacon marks the edge of the shallow water southeastward of Staroe Stambul Mouth (page 215)."

Lines 21 and 22, delete "Pilots" through "entrance" and substitute: "Commercial vessels desiring a pilot to enter the waters of the Danube should wait in a position about 4 miles southeast of St. George Light where the pilots."

Line 22, delete "and."

For "1½ miles" read "about 1 mile."

Page 206.—Line 19, after "light" insert "and whistle."

Delete two bottom lines.

Page 207.—Delete lines 1 to 3.

Page 208.—Delete line 5 from bottom.

Page 209.—Delete paragraph "COAL" and substitute:

"COAL for bunkering purposes is not kept in stock at Sulina.

"FUEL OIL is supplied from floating tanks."

To line 8 add: "There is passenger service by steamer, three times weekly between Sulina, Galatz, and Braila."

**Page 210.**—After line 12 insert:

"One long blast warns vessels alongside a quay to tend their hawsers; three long blasts signifies that a vessel is turning around."

**Page 213.**—Lines 6 and 7 from bottom, delete from "There is" through "smaller ones" and substitute "There are several cranes at the dock, the largest of which is capable of lifting 40 tons."

To bottom line add: "There is also a well-equipped shipbuilding yard at which any repairs can be carried out."

**Page 214.**—Delete lines 3 through 5, inclusive.

After line 5 insert: "Fuel oil can be delivered from tankcars on the wharves."

Line 19, after "Doamna" insert "and Jewish Hospitals."

Line 12 from bottom, after "coal" add:

"A 40-ton crane and a 15-ton floating crane are also available. A small tug is used for assisting vessels to swing around in the dock. There is a marine railway at Braila (see appendix I correction in supplement)."

Line 5 from bottom, delete from "From" through "coal" and substitute:

"About 1,000 tons of coal."

Line 4 from bottom, for "300 to 350" read "100 to 150."

Line 1 from bottom, for "70" read "100."

**Page 216.**—Delete paragraph "VOLCHEK LIGHT" and substitute:

"(For the lights shown in Zebriyani Bay see Light List.)"

Delete paragraph "RANGE LIGHTS."

**Page 218.**—Lines 20 to 19 from bottom, delete from "A fixed" to "Burnas" and substitute:

"A light is shown from a black wooden skeleton structure, with a square daymark, near Burnas. (See Light List.)"

Before paragraph "THE COAST" insert:

"CAUTION.—Moored mines exist off Cape Burnas. (See page 204.)"

**Page 219.**—Lines 2 and 1 from bottom, for "occulting" and "45 feet (13.7 m.)" read "flashing" and "78 feet."

Line 1 from bottom, for "7" read "14" and for gray metal" read "white iron tower with black bands."

**Page 220.**—Line 1, delete "tower, 41 feet (12.5 m.) high."

Delete lines 3 to 16, inclusive, and substitute:

"RANGE LIGHTS are shown from beacons on the south side of the entrance. (See Light List.)

"A SHOAL with a least depth of 5 fathoms is located about 9 miles 103° from Tsarigradskoe Mouth Light."

**Page 221.**—Lines 3–1 from bottom, delete "with" through "offing," inclusive.

Page 222.—After line 4 insert:

"A black trilateral framework pyramidal beacon, 38 feet in height, is situated about 6⅔ miles southwestward of Cape Fontan."

To line 22 add:

"A 5-fathom shoal lies about 9 miles east-southeastward of the lighthouse."

Lines 20 to 19 from bottom, delete "but no" through "Morskaya" and substitute: "a vessel drawing 25 feet reported that she struck an obstruction eastward of Morskaya Bank in latitude 46°04′18″ N., longitude 30°49′30″ E."

Delete paragraph "Buoys" and substitute:

"Buoys.—Two red spar buoys mark the southern end of Morskaya Bank.

"Two black spar buoys mark the northern end of Morskaya Bank."

Lines 12 and 11 from bottom, delete "should the buoys be adrift or out of position."

Page 223.—Lines 8 and 9, delete "occulting white, with red sector 85 feet (25.9.)" and substitute "flashing white, 73 feet."

Lines 10 and 11, for "25 feet (7.6 m.)." read "16 feet."

Lines 22 and 23, delete "On it" through "height."

Lines 19 and 18 from bottom, delete "fixed" through "miles" and substitute "(see Light List.)"

Line 18 from bottom, for "white" read "blue-gray."

Line 17 from bottom, for "90 feet (27.4 m.)" read "78 feet."

Delete line 13 from bottom and substitute:

"Fog Signal.—A fog signal is made on a nautophone at Cape Fontan Light. A bell is held in reserve.

"A Radiobeacon is maintained about 340 yards 161° from Cape Fontan lighthouse. (See H. O. Pub. 205, Radio Navigational Aids.)

"Prohibited Anchorage.—Anchorage is prohibited in the vicinity of a submarine cable extending southward from Cape Fontan."

Line 10 from bottom, for "48° from the old" read "northeastward of the."

Line 5 from bottom, for "from the old lighthouse" read "of the cape."

Lines 2 and 1 from bottom, for "from the old lighthouse" read "of the cape."

Page 224.—Delete lines 1 to 5.

Delete lines 22 to 25 inclusive, and substitute:

"Vorontsovski Light in sight at night leads eastward of the shoal water off Langeron Point in a depth of 8 fathoms.

"Wreck.—A wreck dangerous to navigation, lies about 7⅔ miles eastward of Cape Fontan."

Page 225.—Lines 9–10, delete "and there" to end of paragraph and substitute:

"A Light Buoy, painted red and showing a flashing red light, is moored about ¼ mile south-southwestward of the above 18-foot shoal."

Delete paragraph "Buoys" and substitute:

"Channel Buoys.—A channel, dredged to a depth of 30 feet, leads in close north of the southern detached breakwater and then turns to the northwestward in the direction of the Petroleum Harbor. It is marked by several buoys; the one marking the bend in the channel is a red light and whistle buoy with a flashing red light.

"Less water is reported (1931) northward of the northern detached breakwater."

Page 226.—Line 3, for "67 feet (20.4 m.)" read "56 feet."

After line 5 insert:

"A light is exhibited 1¼ miles 250° from the above light. These two lights in range lead into the harbor. (See Light List.)"

Line 9, for "iron framework towers" read "columns."

Delete paragraph "Mole Lights" and substitute:

"Range Lights are shown from beacons, each consisting of an iron column with diamond-shaped top mark, painted with a red stripe, situated on the northern side of Petroleum Harbor. These lights in range, bearing 327°, mark the dredged channel leading into the harbor.

"A Light is shown at the extremity of the arm of the mole at Petroleum Harbor.

"A Light is shown at the extremity of the arm of Potapovski Mole at Pratique Harbor. (See Light List.)"

After line 26 insert:

"Prohibited Anchorage.—Anchorage is prohibited in a large area in the bay, as indicated by dashed lines on the chart."

Line 4 from bottom, for "28 to 30 feet (8.5 to 9.1 m.)" read "26 to 27 feet in 1939."

Page 227.—Line 2, for "26 feet (7.9 m.)" read "24 to 27 feet in 1939."

Lines 7 to 5 from bottom, delete "It has" to end of sentence and substitute:

"It has been dredged (1932) to a depth of 30 feet between the 3-fathom curve and the eastern arm of the mole.

"In 1939 the depths alongside the mole were from 20 to 27 feet."

Page 229.—To line 12 add: "Pilotage is compulsory for merchant vessels. Pilots may also be obtained here for vessels proceeding to Ochakov."

Page 230.—After line 4 insert:

"A pipe line for supplying fuel oil is laid on a wharf."

After paragraph "HOSPITALS" add:

"DERATIZATION, see supplement correction to page 28."

Page 231.—Before paragraph "Coast" insert:

"Wrecks.—A dangerous wreck lies about 2¾ miles southeastward of Novi Dofinovski. Close northward of the above wreck is a light buoy painted red and white and showing a flashing white light."

Page 232.—Delete lines 3 and 4, from "with" to end of sentence.

After line 12 insert:

"Light.—A light is shown on Point C. (See Light List.)"

Delete paragraphs "Wrecks."

Page 233.—Delete lines 1 to 11 and substitute:

"Ochakov Range Lights.—The front light is shown from a white circular stone tower, 46 feet high, located about 1,400 yards inside Ochakov Point.

"The rear light is shown from a white circular stone tower, 52 feet high, 1,020 yards 68° from the front light.

"These lights in range, bearing 68°, lead through the dredged channel from abreast Berezan Island.

"Another pair of range lights is exhibited northwestward of the above pair. The front light is exhibited from a white wooden beacon 11 feet high; the rear light, situated 0.17 mile 52°15′ from the front light, is exhibited from a white wooden beacon, 37 feet high, with a black vertical stripe in the middle. (See Light List.)"

After line 11 insert:

"Berezan-Ochakov Channel has a least depth of 27 feet (1930)."

Line 9 from bottom, for "black and white spar buoy with cross top mark" read "light and whistle buoy, painted red and white and showing a flashing green light."

Line 6 from bottom, for "3" read "2."

To line 5 from bottom add "and a light buoy, showing a flashing white light, moored close to the easternmost pair of spar buoys. About 6 miles eastward of this light buoy, the northern edge is also marked by a black spar buoy and 700 yards further eastward by a light buoy, painted white and showing a flashing white light."

Page 234.—Line 6, for "flashing" read "an occulting."

To line 15 add "and a red light buoy showing a flashing red light."

To paragraph "Bar" add: "The entrance is marked by a black and white conical buoy and a red and white conical buoy."

Delete paragraph "Beacons."

Page 235.—Delete lines 1–4, inclusive.

Line 18, for "black and white beacon" read "red and white buoy."

Line 20, for "buoy" read "buoys."

Lines 16 and 15 from bottom, delete from beacon on the" through "bearing 70°" and substitute "bring the range beacons at Ochakov in line bearing 68°."

Line 13 from bottom, delete "These marks are said to be difficult to pick up."

Lines 5 and 4 from bottom, for "25 feet (7.6 m.)" read "28 feet."

Page 236.—Delete paragraph "Pilots" and substitute:

"Pilots.—Pilotage is compulsory for merchant vessels navigating Kherson Bay, Dnieper River, and Bug River. There are pilot stations at Kherson and Nikolaev. Vessels inward bound proceeding to Kherson or Nikolaev must call at Odessa to pick up their pilot and customs guard.

"During the winter months a pilot lookout is kept at Ochakov, and vessels anchor about 2½ miles eastward of the southern end of Berezan Island to embark a pilot.

"It is strongly recommended to send a radio notice to the Captain of Port, Odessa, of the expected time of arrival at the breakwater.

"A vessel bound for Kherson and requiring a local pilot should give notice to the Harbor Master at that port at least 6 hours before the vessel is due to arrive."

Page 237.—Line 3, delete "the church."

Delete paragraph "Light Buoy" and substitute:

"Lights.—A light is shown from each extremity of the breakwater off the Quarantine Pier. (See Light List.)"

Delete paragraph "Directions."

Botton line, for "iron" read "wooden."

Page 238.—To line 2 add: "A light which shows only inside the bay is exhibited from a wooden framework beacon, 24 feet high, located near the beacon on Kinburn Point. (See Light List.)"

Line 4, for "white and" read "black and."

After line 6 insert:

"Two light buoys, each painted red and one showing a flashing blue light, the other flashing green, are moored on the northeastern side of the dredged channel located eastward of Kinburn Spit."

Delete paragraph "WRECK."

Page 239.—Line 2, delete a "church and."

Line 16, for "8 feet (2.4 m.)" read "7 feet."

Line 21, after "red" insert "with white sector" and after "miles" insert "in the white sector and 8 miles in the red sector."

Lines 22 and 23 delete "iron" through "(8.2 m.)" and substitute "square iron framework, 18 feet in height."

Delete paragraph "SUVOROV LIGHT."

Line 2 from bottom, for "iron framework support 17 feet (5.2 m.)" read "circular iron tower 40 feet."

Page 240.—Line 1, after "white" insert "with red sectors."

Line 2, for "wooden support" read "circular iron tower, 58 feet in height" and for "49" read "82."

After line 17 insert:

"To further improve the visibility of the range marks by day, a white rectangular shield on a square tower, 36 feet high, has been erected against the low shore cliff, on the range line."

Lines 22 and 23, delete "masts" through "(44.2 m.)" and substitute: "black rectangular framework shields, 13½ feet apart, 33 feet in height, and 136 feet."

Lines 24 and 25, delete "each" through "seen."

Line 20 from bottom, delete "white" and substitute "black framework."

Line 18 from bottom, for "354°" read "350°."

To line 17 from bottom add: "Lights are occasionally shown from these beacons. (See Light List.)"

Lines 16 and 15 from bottom, delete "a short distance eastward of Ochakov Point" and subsitute "the vicinity of Fort Nikolaev."

Page 241.—Line 8, for "buoy being fixed red and fixed" read "buoys being flashing red and flashing."

Line 9, for "fixed red and fixed" read "group flashing red and flashing."

Delete lines 11 and 12.

Page 242.—Lines 13 to 16, delete "Vessels of greater" to end of paragraph.

After line 16 insert:

"DREDGER SIGNALS.—Dredgers when working will hoist a black ball and a red flag on the side off which work is progressing.

"Vessels approaching dredges must slow down in good time, passing them at dead slow speed, and on the side opposite to that on which the ball and red flag are displayed, steam vessels when approaching the dredgers must give a long blast on the whistle, and sailing vessels or motorboats must sound horn.

"If black balls and red flags are hoisted on both sides of the dredges, indicating passage closed, vessels must wait for it to be opened, which will be indicated by the lowering on one side of the ball and red flag."

Lines 19 to 21, delete from "beacon" through "bearing 70°" and substitute "range beacons at Ochakov in line bearing 68°."

Delete line 17 from bottom.

Line 2 from bottom, after "white light" insert "or with Ochakov range lights in line bearing 68°."

Page 243.—Line 13 from bottom, delete "with a church."

Before paragraph "Wreck" insert:

"Light Buoy.—A flashing white light is shown from a light buoy, painted black, and located on the southern side of the dredged channel, 1.63 miles 199° from the center of the small islet close southward of Cape Stanislav."

Delets paragraph "Wreck."

Page 244.—Lines 2 and 3, delete from "is available" through "21 feet" and substitute "a depth of 24 feet (1932)."

Line 8, for "20 feet (6.1 m.)" read "24 feet."

Delete lines 17 to 23 and substitute:

"A Lighted Buoy, painted black and showing a flashing white light, is moored about 4½ miles 121° from Adzhigiol Range Front Light.

"A red light buoy, showing a flashing red light, is moored about 1¾ miles southward of Cape Stanislav, and a red spar buoy with inverted cone top mark also marks the flat extending from Cape Stanislav Spit.

"A lighted buoy, painted black and showing a flashing white light, is moored 6.7 miles eastward of Cape Stanislav.

"The flat extending northward from Verbki Island is marked by a black light buoy showing a flashing white light and by a black buoy showing a flashing green light."

After line 25 insert:

"After discharging at the oil wharf, all vessels of a length of more than 230 feet intending to proceed down the river are to drop down into 'Khersonski Reid' before turning."

Page 246.—Lines 3 and 4, delete from "was available" to end of sentence and substitute "has a depth of 24 feet (1932)."

Delete lines 7 to 11.

After line 20 insert:

"A light is shown from a black beacon at the bend of the dredged channel, 1.2 miles west-southwestward of Kasperovka Range Front Light. (See Light List.)"

Delete paragraphs "Training Wall Lights" and "Buoys" and substitute:

"The channel of the river from Rvach Entrance to Kherson is marked by lights and buoys (see Light List).

"Fog Signal.—A fog signal is sounded at Kherson, near the entrance to the river Koshevaya."

Page 247.—Delete lines 14 to 18.

Line 19, delete "above the lightvessel."

Line 13 from bottom, delete "lightvessel on the south side of the approach" and substitute: "entrance to the marked channel about 3½ miles east-southeastward."

Page 248.—Line 1 from bottom, for "30" read "28."

To line 29, add: "There is a radio station."

Page 249.—Delete lines 1 to 4 and substitute "has been dredged to a depth of 28 feet as far as Nikolaev (1932)."

Line 24 from bottom, add: "A light is shown from this beacon."

To line 20 from bottom, add: "A light is shown from this beacon."

To line 13 from bottom, add: "The front beacon shows an occulting red light and the rear beacon an occulting white light."

Line 9 from bottom, for "290°" read "288°."

To line 8 from bottom, add: "This junction is marked by Sakenski Light, which is a flashing red light shown from a red beacon, in range with the light beacons and located 2,300 yards 288° from the front light beacon. (See Light List.)"

Delete line 7 from bottom.

Delete paragraph "Buoys" and substitute:

"Buoys.—The dredged channel through Bug River as far as Ingul Bridge on the northern side of Nikolaev is marked on the starboard hand, entering by black spar buoys and on the port hand by red spar buoys.

"Light buoys are moored at various places along the channel, those on the starboard hand being painted black and showing a flashing white light and on the port hand, painted red and showing a flashing red light."

Page 250.—Delete lines 1 to 11.

Line 19, for "21 feet (6.4 m.)" read "28 feet."

Line 13 from bottom, for "46 feet (14 m.)" read "34 feet."

Line 3 from bottom, for "128" read "121."

Page 251.—After paragraph "Upper Volosh Light" insert paragraphs:

"Kotelnaya Range Lights.—The front beacon shows a light and is situated about 1 mile north-northwestward from Upper Volosh Lights. The rear beacon shows a light and is located 1,080 yards 305° from the front beacon. These beacons in range 305° lead through the channel northeastward of the Lower and Upper Volosh Lights. (See Light List.)

"Range Lights.—Two lighted range beacons, in line bearing 223°, are located about 3 miles northward of Upper Volosh. Their alignment is coincident with that of the Siversov Range. (See Light List.)

"Kozirka Range Lights.—The front beacon shows a light and is located on the western side of the river at Kozirka, about 3 miles northwestward of Ozharsk Light. The rear beacon shows a light and is situated 1,263 yards 353° from the front beacon. These beacons in range 353° lead through the channel westward of Ozharsk Spit. (See Light List.)"

Line 20, for "23 feet (7 m.)" read "16 feet."

Delete paragraph "A Beacon."

Line 13 from bottom, for "two churches" read "a church."

Delete paragraph "BUOY" and substitute:

"LIGHT BUOY.—A red light is shown from a red light buoy moored off the eastern extremity of the groin."

Line 4 from bottom, after "KONSTANTIN" insert "FRONT RANGE" and for "11 feet (3.4 m.)" read "36 feet."

At bottom of page insert:

"The Rear Light, occulting white and visible from 138° to 151° is shown at an elevation of 196 feet from the roof of the Siversov Rear Range Lighthouse, which is 1,680 yards 145° from Konstantin Front Range Light. (See Light List.)"

Page 252.—Delete lines 1 to 3.

Line 6, for "red" read "red and white horizontally striped."

Line 12, for "westward" read "eastward."

To line 13 add "buoy showing a flashing white light."

Delete lines 14 to 15.

Delete paragraph "DIDOVA KHATA LIGHT."

Line 16 from bottom, for "fixed red" insert "flashing white."

Before paragraph "COAST" insert:

"BEACON FOR ADJUSTING COMPASSES.—A beacon for compass adjustment, consisting of a post surmounted by a red pentagonal shield, stands on Lyeskov Spit. This beacon in range with the cupola of Korenikha Church bears 272°."

Page 253.—Line 2, after "conical buoy" insert: "showing a flashing white."

Delete lines 7 to 13 and substitute:

"RANGE LIGHTS have been established northward of Bolshaya Korenikha. The lights are in range 230°, are 300 yards apart, and each structure carries a white rectangular shield, with black vertical stripe, surmounted by a ball. (See Light List.)"

After line 18 from bottom insert:

"PROHIBITED AREA.—Navigation is prohibited in an area which is marked by black and white buoys and is northward of the entrance to the Ingul River. A shoal with a depth of less than 6 feet lies at the center of this area."

Line 8 from bottom, for "lights" and "yellow" read "beacons" and "fixed red."

Page 254.—Line 4 from bottom, after "starboard" insert "; keep Kotelnaya Range beacons in line 305° until Kozirka Range beacons are in line 353°."

Page 255.—Delete paragraph "BY NIGHT."

Page 257.—To line 4 add: "DEPTH SIGNALS are also shown. See page 45."

Page 258.—In paragraph "TIME BALL" delete "(Temporarily discontinued, 1925.)."

Page 259.—After line 16 insert:

"EGORGLYTSKI LIGHT.—A light is shown from a black framework structure, 28 feet high and with a ball daymark, situated on the southern end of Dolgi (Dolghi) Island. (See Light List.)"

Before paragraph: "LANDMARK" insert:

"A RADIOBEACON is operated at Tendra Peninsula Light Station. (See H. O. No. 205, Radio Navigational Aids.)"

Page 260.—Delete paragraph "TENDRA POINT (OCCASIONAL) LIGHT" and substitute:

"TENDROVSKI LIGHT is shown from a black skeleton structure, 26 feet high, situated on Tendra Point. (See Light List.)"

Line 8, for "three" read "two."

Line 14, for "and a third" read "TENDROVSKI ZHELEZNI LIGHT."

Line 15, after "second" insert "beacon," and after "is" insert "shown from."

Before paragraph "WRECKS" insert:

"BUOYS.—Four spar buoys with conical top marks mark the flat extending eastward from Tendra Spit. Three spar buoys with conical top marks mark the flat extending westward from Egorlytski Peninsula.

"A spar buoy with conical top mark is moored in the bay about 3¾ miles southeastward of Tendra Point Lighthouse."

Line 19 from bottom, for "upper works showing above water" read "a least depth of 8 feet and marked by a spar buoy with a cross top mark."

Page 261.—Before paragraph "A 3-FATHOM PATCH" insert:

"SOFIEVSKA LIGHT is shown at the coast guard station near the western end of Dzharilgatski Bay. (See Light List.)

"WRECK.—A wreck dangerous to navigation lies sunk about 18.5 miles 257° from Sofievska Light."

Line 15 from bottom, for "is situated about" read "lies 1½ to."

Page 262.—Lines 4 and 5, delete "which" through "white church."

Line 5, delete "the church of the."

Line 8, delete, "inverted."

Lines 8 and 9, delete "and by a red conical buoy northeastward of the point."

Line 10, for "two" read "a."

Line 11, for "cones" read "cone."

To line 12 add: "A spar buoy marks the 3-fathom patch southward of the point."

Before paragraph "ANCHORAGE" insert:

"LIGHT BUOYS.—A flashing white light is shown from a light buoy, with conical top mark, point up, located about 2.3 miles 38° from Dzharilgatski Point Light.

"A light buoy, painted white and showing a flashing white light, is moored about 5¾ miles northwestward of the light on Dzharilgatski Point. A spar buoy is moored eastward of this light buoy."

Delete paragraph "PILOTAGE" and substitute:

"PILOTAGE.—There is a pilot station at Skadovsk. Pilotage is compulsory for vessels bound for Skadovsk and Khorli. The pilot will meet a vessel southeastward of Dzharilgach Point near the spar buoy marking the shoal water."

Line 10 from bottom, for "1924 of 9 feet (2.7 m.)" read "1939 of 16 feet."

Delete lines 8 and 9 from bottom and substitute:

"RANGE LIGHTS.—The front light is shown from a red and white vertically striped mast with red triangle, 30 feet in."

Delete lines 5 and 6 from bottom and substitute:

"The rear light is shown from a black and white vertically striped mast with white diamond top mark, 52 feet in height. (See Light List.)"

Page 263.—Line 17, for "26 feet (7.9 m.)" read "22 feet in 1925."

Delete lines 11 and 10 from bottom.

Line 6 to 1 from bottom, delete "a red" through "mark" and substitute: "Two buoys on its western side and one buoy off its southern extremity."

Page 264.—Line 2, for "1924" of 19½ feet (5.9 m.)" read "1927 of 21½ feet."

Line 7 after "entrances" insert "and at the bend of the channel."

Line 9, add: "A light buoy showing a flashing white light marks the western entrance, and a light buoy showing a flashing red light marks the eastern entrance."

Lines 11 and 12, for "1922 of 20 feet (6.1 m.)" read "1939 of 17 feet."

Line 13, after "top marks" insert "with the exception of the outer pair only."

Delete paragraph "RANGE LIGHTS" and substitute:

"RANGE LIGHTS.—The front light of a range is shown from a beacon, 19 feet high, which stands on the shore at Khorli. The beacon consists of a white rectangular shield with a black stripe.

"The rear light is shown from a beacon which consists of a similar shield, 49 feet high. It stands 233 yards 11° from the front light (see Light List.)"

Delete paragraph "PILOTS."

To paragraph "COMMUNICATION" add: "There is also a radio station at Khorli which is open to public correspondence."

Page 265.—Lines 6 and 5 from bottom, delete "black" through "ball" and substitute "light, shown from a black iron skeleton structure, 51 feet high. (See Light List.)"

Bottom line, for "conical buoy" read "light buoy showing a flashing white light."

Page 266.—To line 7 add "A passage across the spit, 2¾ miles northward of the beacon, is marked by spar buoys and has a depth of 14 feet."

Page 267.—After line 19 insert:

"CAPE KARA BURNU LIGHT is shown from a black iron skeleton structure, 51 feet high situated on the cape.

"LIGHT-BEACONS.—Two beacons, each consisting of a square black shield with white vertical stripe and surmounted by a black triangle, stand on the eastern shore of the bay and lead through the entrance when in range bearing 89°. A light is shown from each of the beacons. (See Light List.)"

Line 13 from bottom, for "yellow tower" read "white square stone tower with a brown band."

Delete lines 11 to 1, inclusive, from bottom of page.

Page 268.—Delete lines 1 through 3.

Line 4, for "yellow" read "white" and for "mill" read "windmill."

Line 5, for "188°" read "186°."

Before paragraph "ANCHORAGE" insert:

"STORM SIGNALS are shown from the lighthouse."

Page 269.—After paragraph "BANK" insert:

"Two spar buoys, with two cones, bases together, as a top mark, are moored at the western end of this bank."

Delete paragraph "STORM SIGNALS" and substitute:

"A RADIOBEACON is maintained at the light station. (See H. O. Pub. 205, Radio Navigational Aids.)"

Page 270.—Before paragraph "EUPATORIA POINT" insert:

"POPOVKA LIGHT is shown from a white pyramidal skeleton structure, 56 feet in height, situated about 15 miles eastward of Uret Point. (See Light List.)"

Delete line 5 from bottom and substitute:

"A RADIOBEACON is maintained at the light station. (See H. O. Pub. 205, Radio Navigational Aids.)"

Page 271.—After paragraph "WRECK" insert:

"A LIGHT is shown from a white skeleton pyramid, 25 feet high, on the coast just northward of Kizilyar Lake. (See Light List.)"

Page 272.—Delete paragraph "MOORING BUOYS."

To line 21 add: "The chimney of the salt works at the western end of Sakskoe Lake is conspicuous."

Line 23 from bottom, for "light buoy, showing a fixed green light" read "nun buoy."

Line 22 from bottom, for "520 yards east-" read "800 yards."

Line 21 from bottom, for "Another light" read "A light and whistle."

Lines 21 and 20 from bottom, for "fixed red" read "flashing white."

Delete lines 18 to 16 from bottom.

Lines 14 and 13 from bottom, delete "and a" to end of paragraph.

Line 11 from bottom, after "house" insert "with red vertical stripe."

Delete "on piles" and substitute "on a white framwork tower, 28 feet high".

Delete lines 8 and 7 from bottom.

Page 274.—Before paragraph "COAST" insert:

"LIGHTS.—A light is shown from a red skeleton structure on Cape Lukul.

"A light is exhibited from Lukul Bluff, 3 miles southward of Cape Lukul. (See Light List.)"

Line 4, for "¾" read "1."

After line 25 insert:

"Spar buoys with broom top marks are moored 7.7 miles 197°, 8.9 miles 214°, 7.4 miles 223°, 3.24 miles 224°, 6.08 miles 236°, and 5.54 miles 245° from Lukul Bluff Light."

Page 275.—Lines 2–3, delete "marked by temporary buoys."

Page 276.—Line 2, after "buoy" insert "with inverted cone top mark."

To paragraph "BUOYS" add: "A black and white checkered can buoy is moored to mark a spoil ground about 400 yards northward of North Point."

Page 278.—Line 18, for "38 feet (11.6 m.)" read "20 feet."

To line 19 add: "A fog signal is made."

Page 279.—Line 13, for "white" read "green."

After line 14 insert:

"A red light buoy, with inverted cone top mark and showing a flashing red light, is located northward of the above-mentioned light buoy."

Delete lines 15, 16, and 17.

Page 280. Line 4, before "Four" insert "One pair of spherical buoys and."

Line 5, for "black" read "white."

To line 6 add: "The channel has a depth of 4 feet."

Line 9, for "40 feet (12.2 m.)" read "33 feet."

Line 13, after "lighthouse" insert "33 feet high."

Line 15, for "195°" read "95°."

Line 24, for "11 feet (3.4 m.)" read "6 feet."

Page 281.—To line 8 add "or in the vicinity of any of the submarine cables shown on the chart."

Delete paragraph "Port Regulations" and substitute:

"Port Regulations.—Vessels, when eastward of a line drawn from the western entrance point of Quarantine Bay to the light and whistle buoy off Konstantin Shoal, must keep to the line of Inkerman Range Lights.

"Vessels having no regular berths must anchor off the entrance to Inner Harbor or South Bay in an area which is limited on the west by the meridian of Nicholas Point and on the east by a line joining Paul Point and the point of the old No. 4 Battery.

"Vessels wishing to enter Sevastopol must notify the Commander in Chief, Sevastopol, 7 days before the ship is due in port.

"Entry is allowed only between surise and sunset, vessels approaching at night must wait until sunrise at Laspi Bay, or Alma, Tamaskski Bay, or in latitude 44°38′ N., longitude 33°21′ E."

Page 283.—To paragraph "Pilots" add "Pilotage is compulsory. There are pilot stations at Sevastopol and Streletska Bay.

"Vessels proceeding to Sevastopol should approach the point of intersection of the range lines of the Inkerman Lighthouse and Streletska Bay Beacons.

"If a pilot is not available at the time, vessels should anchor or proceed to a position about 200 yards from the intersection of the range lines and await the arrival of a pilot."

Page 284.—Line 12–13 delete "from the" through "Point."

Line 13, for "14m. 07.6s." read "00m. 00s."

Delete lines 15 to 18 and substitute:

"A light is switched on at 11h. 55m. 00s. and remains burning until 11h. 59m. 00s., when 10 short flashes are made, then the light continues to burn until 12h. 00m. 00s., when it is extinguished."

Line 19, for "the instant of the dropping of the ball" read "noon."

Line 9, from bottom, for "black" read "red and white."

Line 8 from bottom, for "red" read "black and white."

Line 5 from bottom, for "red can buoy" read "white spar buoy with cone top mark, point up."

(* * *)

Line 2, for "9" read "7."

Page 285.—Line 1, for "fixed" read "occulting."
Line 2, for "9" read "7."
Lines 4 and 5, delete "(Extinguished, 1925)."

Page 288.—After paragraph "Fog Signal" insert:
"A Radiobeacon is situated on the cape. (See H. O. Pub. 205, Radio Navigational Aids.)"

Page 289.—Before paragraph "Cape Feolent" insert:
"Measured Distance.—Three pairs of beacons between Cape Khersonese and Cape Feolent mark a distance of 4.84 miles on a course of 137°–317° in two sections, the northwestern 1.99 miles and the southeastern 2.85 miles. The front beacons are framework shields with triangle top marks, painted white with a red vertical stripe. The rear beacons are similar but carry an inverted triangle and are all white."

Page 290.—After line 12 insert:
"Light.—A light is exhibited from a red iron framework column, situated on the eastern side of the entrance to the harbor. (See Light List.)"

Page 292.—Lines 24 and 25, for "alternating fixed and flashing white, with white and red flashes" read "fixed and alternate flashing white and red."

Page 294.—Line 4, after "fixed" insert "and flashing."
Line 6, for "51 feet (15.4 m.)" read "36 feet."
After line 15 insert: "A radiobeacon is operated at the light station. (See H. O. No. 205, Radio Navigational Aids.)"
Line 2 from bottom, for "siren" read "bell."

Page 295.—Line 1, delete "Buoy' through "marks" and substitute:
"Buoys.—Two spar buoys with top marks consisting of two cones, points together, mark."
Line 19, for "is" read "was."
Line 20, for "is" read "was."
To line 21 add: "but the harbor is reported (1927) to have shoaled considerably."
Line 24, for "one" read "four."

Page 296.—After line 3 insert:
"Pilot.—A pilot is stationed at Yalta."
Lines 22 and 23, for "plentiful and cheap" read "can be obtained in small quantities."

Page 298.—Lines 16 and 17, for "alternating white and red" read "flashing white." Lines 17, for "6" read "8" and for a "a red hut" read "a hut."
Line 18, after "pillars" insert "painted in red-and-white horizontal stripes."
Delete paragraph "Mooring Buoy."
Delete line 15 from bottom and substitute "348 feet in length. Two fixed white vertical lights are shown from the head of the pier."

**Page 299.—Line 18, for "alternating white and" read "flashing."**

**Line 19, delete "visibilities 6 and 3 miles, respectively" and for "yellow" read "red and white stripes."**

**Line 20, for "20 feet (6.1 m.)" read "14 feet."**

Page 300.—Line 13, delete "fixed and."

Lines 14 and 15, delete "fixed light visible 16 miles."

Lines 15–16, for "51 feet (15.5 m.)" read "41 feet."

Line 11 from bottom, after "southeast" insert: "Rocks with a least depth of 7 feet lie about 200 yards offshore. In 1939 there was a depth of 12 feet in the channel leading to the pier in Koktebel Bay. The range line leading to the pier should be strictly followed."

After paragraph "KOKTEBEL BAY" insert:

"RANGE LIGHTS.—The front light of a range is shown from a white rectangular beacon, 13 feet high, surmounted by a triangular daymark and painted in a black stripe. This structure stands about 5¼ miles westward of Cape Kiik Atlama. The rear light is shown from a similar structure which stands 0.65 miles 326° from the front light. These lights are shown on request (see Light List).

"Range lights, which, in range 296°, lead through the approach channel to the pier, are shown from the head of the pier and on the slope of the hill in the rear. (See Light List.)"

Page 301.—To line 15 from bottom add: "Navigation is now prohibited eastward and southward of Cape St. Eli as indicated by dashed lines on the chart. This area is marked by a light buoy, painted white and showing a flashing white light, a light buoy painted white and red and showing a red light, and a spar buoy, surmounted by two brooms, points together. These buoys are located respectively, 2.7 miles 44°, 3.7 miles 87°, and 4.5 miles 149° from Cape St. Eli Light."

Line 3 from bottom, for "white" read "black" and for "36 feet (11 m.)" read "32 feet."

Page 302.—Lines 17–18, for "38 feet (11.6 m.)" read "32 feet."

Line 19, for "white" read "green."

Delete lines 20 to 18 from bottom and substitute:

"A light is exhibited from the extremity of a jetty located about 2 miles northward of the East Mole. (See Light List.)"

To line 17 from bottom add: "and when a vessel's fog signals are heard a gun will be fired, in addition to the bell, until the vessel has entered or passed the harbor.

"TIME SIGNAL.—A gun is fired every Thursday at noon, standard time, corresponding to 10h. 00m. Greenwich civil time."

Page 303.—Delete paragraph "DIRECTIONS."

Page 304.—After paragraph "COMMUNICATION" insert:

"RADIO.—There is a radio station at Theodosia. (See H. O. Pub. 205, Radio Navigational Aids and H. O. Pub. 206, Radio Weather Aids to Navigation.)"

After line 11 from bottom insert:

"CAUTION.—Navigation is prohibited at the head of the bay as indicated by dashed lines on the chart. The southwestern side of this area is marked by a spar buoy, with a top mark consisting of an upturned broom, located 4.6 miles 48° from Cape St. Eli Light.

"Wreck.—A dangerous wreck lies 6 miles west-northwest of Cape Chauda."

Line 2 from bottom, after "shore" insert:

"A rock, with a least depth of 6 feet the existence of which is doubtful, is charted in a position about 1½ miles southward of Dyurmen Point."

Page 305.—Line 3, before "flashing" insert "group."

After line 7 from bottom insert:

"A Light is exhibited from a black framework structure with ball top mark, situated on the rocks. (See Light List.)"

Line 2 from bottom, after "with" insert "faint white."

Bottom line, for "12" read "20."

Page 306.—Lines 1 and 2, delete "107 feet (32.6 m.) in height."

After line 2 insert:

"Radiobeacon.—A radiobeacon is located at Kyz Aul Point Light. (See H. O. Pub. No. 205, Radio Navigational Aids.)"

After paragraph "Spitfire Rock" insert: "The rock is marked by a light buoy painted red and showing a flashing red light. A red spar buoy, surmounted by an inverted cone, is moored near the light buoy."

Page 307.—Lines 7 and 8, delete from "In 1921" to end of sentence.

Delete lines 9 and 10 and substitute:

"In the Kertch-Yenikale section the least depth in the channel is 22½ feet (1934).

"Kertch-Yenikale Strait and other narrow waters are navigated only by day."

Before paragraph "Water Level" insert:

"Caution.—Mariners are cautioned that moored mines exist in the northern approach to Kertch Strait in the area enclosed by lines joining the following positions:

|  | ° ′ ″ | ° ′ ″ |
|---|---|---|
| (*a*) | Lat. 45 29 00 N., | long. 36 45 24 E. |
| (*b*) | Lat. 45 25 00 N., | long. 36 43 12 E. |
| (*c*) | Lat. 45 25 00 N., | long. 36 45 24 E. |
| (*d*) | Lat. 45 29 00 N., | long. 36 47 36 E. |

"Note.—This area has been swept and is clear of mines to a depth of 12 feet."

Lines 14 to 15, delete "the guard" through "Yenikale" and substitute: "a mast on Mount Khronya (Yenikale Hill)."

Page 308.—Delete paragraph "Guard Ship."

Line 15, after "Strait" insert "and the Sea of Azov." Delete "Tulza Light Vessel."

Delete line 16 and substitute "and Mariupol."

Delete lines 17 to 20, inclusive, and substitute: "Vessels requiring a pilot should signal when approaching the Kerch Yenikale channel. A vessel should await the arrival of a pilot in the vicinity of the light and whistle buoy southward of the entrance to the Kerch Yenikale Channel.

"In order to facilitate the embarking or disembarking of pilots, all vessels bound for ports in the Sea of Azov or from the Sea of Azov to the Black Sea, when 100 miles from the approach to the southern entrance to the Kerch Yenikale Channel, are to inform the captain of Kertch Commercial Port by radio of the time of their arrival and the port to which they are bound, also giving the expected time of their arrival at Kertch Road.

"Medical examination and control are carried out in the south roadstead and are repeated at the port of destination."

Lines 15 to 13 from bottom, delete "The" to end of paragraph and substitute:

"CAPE TAKIL LIGHT is shown on the summit of the cape. (See Light List.)"

To bottom of page, add:

"A similar buoy is moored eastward of the Cape Takil Reef."

Page 309.—Line 3, after "buoy" insert "painted black and."

Delete line 5 and substitute:

"A WRECK with a depth of 39 feet over it lies about 2¼ miles 82° from Cape Takil Light.

"PROHIBITED ANCHORAGE.—Anchorage is prohibited in the southern entrance to Kertch Strait eastward of Cape Takil between the parallels 45°05'30" N. and 45°09'00" N."

Line 10, for "6 feet (1.8 m.)" read "3 feet."

Delete lines 15 to 3 from bottom and substitute:

"A LIGHTED WHISTLE BUOY, painted red and showing a flashing red light, is moored in the approach to Kertch Strait at about 2 miles east-southeast of Nijni Burunski Light. (See Light List.)

"A spar buoy, surmounted by two cones, points together, is moored close eastward of this light and whistle buoy."

Botton line, for "112 feet (34.1 m.)" read "102 feet."

Page 310.—Line 1, for "42 feet (12.8 m.)" read "32 feet."

Line 6, for "35 feet (10.7 m.)" read "26 feet."

Line 8, delete "(See sketches on chart)."

After line 23 from bottom insert:

"Kamish-Burunski Harbor is at the head of the bay. The dredged channel, which is 266 feet wide and has a depth of 22 feet, is marked by buoys and by a pair of range lights, and in this connection the northernmost of the buoys marking the western side of Pavlovaki Reach has been replaced by a light buoy, painted red and showing a flashing blue light.

"A dredged basin, 3,773 feet long, 1,323 feet wide at its entrance, narrowing to 266 feet at its head, is located in the bay. It has a depth of 22 feet and is marked by spar buoys."

Lines 21 and 20 from bottom, for "square tower, 38 feet (11.6 m.)" read "stone tower with house 22 feet."

Lines 20 and 19 from bottom, delete "on the" through "roof."

Line 18 from bottom, delete "(See sketch on chart)."

Lines 16 and 15 from bottom, for "square building with flat gabled roof, 39 feet (11.9 m.)" read "stone tower, 23 feet."

To line 14 from bottom add: "It is difficult to distinguish this rear light from the lights of the buildings at Kamish-Burunski."

Line 12 from bottom, for "24 feet (7.3 m.)" read "23½ feet."

Before paragraph "CAPE PAVLOVSKI" insert:

"The front and rear lights of another range (276°30') are located, respectively, 540 and 500 yards 96°30' from Kamish Front Range Light. These lights are shown from iron structures which are painted white with a black vertical stripe.

"WHARF LIGHTS are shown. (See Light List.)"

Page 311.—Line 3, for "56 feet (17.1 m.)" read "40 feet."

Line 7 for "36 feet (11 m.)" read "27 feet."

Line 11, after "beacon" insert "with a red vertical stripe."

After line 18, add:

"Buoys.—A lighted buoy, painted black and white and showing a flashing white light, is located about 1½ miles 172° from Nijni Pavlovski Light.

"A lighted buoy, painted red and showing a flashing blue light, is located about 2 miles 209° from the same light. (See Light List.)"

Delete paragraph "Fog Signal."

Page 312.—Line 7, for "buoy" read "light buoy" and after "top mark" insert "showing a flashing red light."

Line 8, for "between" read "eastward of."

Page 313.—Line 4, for "the same depth" read "15 feet depth (1938) and marked by buoys."

To paragraph "Pier" add "Two lights are shown from the outer end of the pier, one on the southeastern and one on the northwestern corner.

"Range Lights.—The front light is exhibited from an iron beacon, 510 yards 29° from the pier head.

"The rear light is exhibited from an iron beacon, 300 yards 23° from the front light. The lights are exhibited only on request.

"Fog Signal.—A fog signal is made from the pier. (See Light List.)"

Line 5, for "180" read "262."

Line 8, for "340°" read "332°."

Line 9, for "1925" read "1938."

Line 10, for "had decreased to 13½ feet (4.1 m.)" read "was 20½ feet."

Delete lines 15 to 31 and substitute:

"Light Buoys—Lights.—A red light buoy, showing a flashing green light, is moored about 1⅓ miles southeastward of the head of Genoese Breakwater.

"A black light buoy, showing a flashing white light, is moored 360 yards 62° from the head of Genoese Breakwater.

"The dredged channel is marked by range lights as follows:

"The front light is shown from a building on the southwestern corner of Shiroki Mole.

"The middle light is shown from a black and white horizontally striped structure, 43 feet in height, 720 yards 355° from the light at the northern end of Genoese Mole.

"The rear light is shown from a black and white horizontally striped structure, 63 feet in height, 1,600 yards 331° from the light.

"These lights in range bearing 331° lead through the new dredged channel.

"A pair of range lights leads through a channel dredged (1938) to a depth of 15 feet to the petroleum depot on the western side of Kertch Road. The lights are in range 272°. (See Light List.)"

Lines 11 to 13 from bottom, delete "Two vertical" to end of paragraph.

Line 10 from bottom, for "green light with red sector" read "light with red and blue sectors" and for "38 feet (11.6 m.)" read "37 feet."

Line 9 from bottom, for "a gray" read "an iron."

Line 4 from bottom, for "13 and 14 feet (4 and 4.3 m.)" read "12 and 20 feet."

To bottom line add "These lights are only shown when vessels are expected.

"An occasional fixed blue light, which is only shown when small vessels are approaching, is situated 240 yards 152° from the front light of the new dredged channel, and a fixed red light is shown from the northeastern corner of the same mole that the blue light is shown from."

Page 314.—Delete paragraph "Buoys."

To line 7 from bottom add "and from a mast on Genoese Mole."

Delete line 4 from bottom.

Page 315.—Line 14 from bottom, for "the town" read "the town of Yenikale."

After line 10 from bottom insert:

"A Light Buoy, painted red and showing a flashing red light, is moored near the southern side of this bank and the northern side of the dredged channel about 1,400 yards south-southwestward of Cape Yenikale. A red conical buoy is moored near the southwestern edge of the above-mentioned bank.

"A light buoy, painted black and white and showing a flashing white light, has been established about 2 miles 157° from Cape Yenikale Light. (See Light List.)"

Line 6 from bottom, for "24 feet (7.3 m.)" read "23½ feet."

Line 4 from bottom, for a "flashing" read "an occulting."

Page 316.—Delete lines 10 to 16.

After line 16 from bottom insert:

"Fog Signal.—A fog bell is located at Cape Yenikale."

After line 10 from bottom insert:

"Light Buoy.—A light buoy, painted black and showing a flashing white light, is moored about 4 miles 31° from Cape Fonar Light. A spar buoy is moored close to the lightbuoy.

"A light buoy, which exhibits a flashing white light, is moored 1¾ miles south-southeastward of Cape Fonar.

"Beacons.—The turns in the channel leading from Yenikale Reach into the Sea of Azov are marked by range beacons, one pair standing south of Cape Yenikale Light and the other pair near Opasmaya, northward of Cape Yenikale."

Delete paragraph "Prohibited Anchorage—Telegraph Cables" and substitute:

"Prohibited Anchorages.—A prohibited anchorage area extends in a southeasterly direction from the town of Yenikale to a point on the opposite shore in the vicinity of Blijni Chushka Light.

"Another prohibited anchorage area extends eastward from Yenikale Light and Cape Varzovka, to the opposite shore.

"For details regarding the limits of these areas, see the chart."

Line 2 from bottom, delete "bridge" through "water" and substitute "a depth of 12 feet."

Page 317.—Delete paragraph "Spoil Ground" and substitute:

"Spoil Ground.—There is a spoil ground ¾ mile northeastward of Cape Varzovka, situated between Cape Yenikale and Cape Khroni, which is marked by a red spar buoy surmounted by two cones, bases together."

After line 12 insert:

"A Light is shown from a white cylindrical iron tower, 41 feet in height, on Zhelyezni Rog. (See Light List.)"

Lines 13 and 12 from bottom, for "western" read "southern."

After line 5 from bottom insert:

"A shoal with a least depth of 20 feet exists 1¾ miles southward of southeast Aksenova.

"This shoal is marked by a light and whistle buoy showing a group flashing white light. Close eastward of the lighted whistle buoy is a spar buoy with an upturned broom top mark."

Page 318.—Lines 10 and 11, delete "WHISTLE BUOY" through "(13.7 m.)."

To line 18 add: "marked by a black spar buoy with conical top mark, point up."

Delete lines 2 and 1 from bottom.

Page 319.—Delete lines 1 to 10 and substitute:

"SPOIL GROUND—BUOYS.—A disused spoil ground is located on Tuzla Bank and is marked by buoys as follows: two black and white spar buoys with conical top marks, points up, moored about 2¼ and 3¾ miles, respectively, southward of the northwestern end of Tuzla Spit; a white spar buoy with top mark consisting of two cones, bases together, moored close eastward of the light buoy and about 2¼ miles south-southeastward of the northwestern end of Tuzla Spit; a red spar buoy consisting of two cones, bases together, moored 3¾ miles south-southeastward of the northwestern end of Tuzla Spit.

"SHOAL.—A 22-foot shoal lies about 4½ miles southeast of Cape Kamish Burnu. A black and white cross spar buoy is moored close north of it."

Lines 15 and 14 from bottom, delete from "black" to end of sentence and substitute: "spar buoy surmounted by a red cross over a black ball."

Delete lines 12 and 11 from bottom.

Page 320.—Delete paragraph "BUOYS" and substitute:

"BUOYS.—The entrance from Kertch Strait is marked on the eastern side by a light buoy, painted red, and exhibiting a flashing white light, and by a spar buoy surmounted by two cones with bases together, moored on the western 2-fathom edge of the shoal extending from Chushka Spit; and on the western side by a spar buoy surmounted by two red cones, points together, which is moored ½ mile westward of the western edge of the above shoal.

"The entrance to the eastern part of the bay is marked by a light buoy, painted red, which exhibits a flashing red light, moored on the northern side; and on the southern side by two spar buoys with cone top marks.

"SPOIL GROUND.—A spoil ground extends about 800 yards offshore between positions on the coast about ½ mile and 1½ miles westward of the summit of Lisaya Hill."

After line 13 from bottom insert:

"RANGE LIGHTS.—Two range lights, known as the Stanitsi Sennoi Range Lights, are located at the head of the eastern part of Taman Bay. (See Light List.)"

To line 8 from bottom add: "There is a radio station at Taman Pier."

Page 321.—Line 7, for "black" and "red" read "red" and "white."

To line 9 add: "Two spar buoys are moored close to this light buoy."

Line 12, for "59 feet (18 m.)" read "49 feet."

Lines 15 and 16, for "78 feet (23.8 m.)" read "70 feet."

Before paragraph "DIRECTIONS" insert:

"LIGHT.—A light is shown at Cape Akhilleon. The light is exhibited from a black framework structure on a white square tower, 30 feet in height. A fog siren is sounded at the light. (See Light List.)"

Lines 10 to 8 from bottom, delete "24 feet" through "considerably" and substitute "23½ feet."

Delete lines 6 and 5 from bottom and substitute:

"In 1934 the Kertch-Yenikale Channel had a dredged depth of 23½ feet."

Page 322.—Line 5, after "must" insert "give three long blasts on the siren."

After line 6 insert:

"The dredger will then sound one short blast if the approaching vessel is to pass to starboard, or two short blasts if the vessel is to pass to port of the dredger. The dredger will show a red flag by day and two red vertical lights by night on the side on which the approaching vessel is to pass.

"Should any circumstance make it impossible for a vessel to pass, the dredger will hoist by day two red balls with a white shape between them, and by night two red lights with a white light between them."

Delete lines 7 to 15.

After line 6 from bottom insert:

"RANGE LIGHTS.—The front light is exhibited from a red framework beacon, 33 feet in height, on Chushka Spit, about 3¾ miles 98° from Cape Yenikale Light.

"The rear light is exhibited from a white framework beacon, 59 feet in height, 3.8 miles 67° from the front light.

"These lights in range lead through Kertch-Yenikale Channel. (See Light List.)"

Page 323.—Line 21, for a "a black buoy" read "two black buoys."

To line 22 add: ", and a red light buoy showing a flashing light."

Line 7 from bottom, for "3" read "3½."

Page 324.—To line 9 from bottom add "Two rectangular framework beacons, painted black with a white vertical stripe, situated northeastward of Cape Pavlovski, and in range 355°, also mark the turn from Kertch-Yenikale Channel into Burunski Channel."

Line 8 from bottom, for "2 to 3" read "3½."

Lines 6 and 5 from bottom, for "Tuzla Light Vessel" read "the light and whistle buoy about 7 miles northward of Cape Takil."

Page 325.—Delete line 4 and substitute "marking the northern edge of Khersonskaya Bank."

Page 326.—Delete paragraph "RANGE LIGHTS" and substitute:

"RANGE LIGHTS.—The front light, shown from a black iron framework structure, surmounted by a triangular top mark, the whole 33 feet high, is located on the eastern bank of the Kuban River.

"The rear light, shown from a similar structure, surmounted by a spherical top mark, the whole 65 feet high, is located about 800 yards 140° from the front light."

Delete lines 12 to 18 and substitute:

"A light is exhibited from an iron column on each mole, about 100 yards within their outer ends. (See Light List.)"

Line 11 from bottom, add "(1938) the channel had a depth of only 12 feet."

To line 3 from bottom add: "See amended depth above."

Page 327.—After line 4 insert:

"Storm Signals are shown. See page 33.

"Life-Saving Station.—There is a light-saving station at the harbor."

After line 24 insert:

"Light.—A light is exhibited from a beacon located on the northern extremity of the southern side of the entrance to the Sladkoe River, which discharges about 5½ miles west-southwestward of Achuev. (See Light List.)"

Before paragraph "Buoys" insert:

"Caution.—Mariners are cautioned that moored mines exist in the approach to Akhtarski Bay in the area inclosed by lines joining the following positions:

| | | ° | ′ | ″ | | | ° | ′ | ″ | |
|---|---|---|---|---|---|---|---|---|---|---|
| (*a*) | Lat. | 46 | 23 | 00 | N., | long. | 37 | 47 | 00 | E. |
| (*b*) | Lat. | 46 | 04 | 42 | N., | long. | 37 | 47 | 00 | E. |
| (*c*) | Lat. | 46 | 04 | 42 | N., | long. | 38 | 00 | 00 | E. |
| (*d*) | Lat. | 46 | 18 | 00 | N., | long. | 38 | 00 | 00 | E. |

Line 5 from bottom, for "surmounted by an inverted cone" "read "with a red band."

Line 3 from bottom, after "Lighthouse" insert: "A light buoy, painted black and showing a flashing red light, is moored in the vicinity of this spar buoy."

Line 2 from bottom, for "an inverted cone" read "two cones, bases together."

To bottom line add: "A light buoy, painted with white and black horizontal bands and showing a flashing white light, is moored near this buoy."

Page 328.—Lines 4 and 5, delete "painted" through "cone" and substitute "surmounted by two cones, bases together."

Line 8, delete "A conical buoy" and substitute:

"Two spar buoys."

Lines 8 to 9, delete "and surmounted by a cone, is" and substitute "are."

Line 10, for "4" read "5".

Line 16, for "red, 32 feet (9.6 m.)" read "green, 37 feet."

Line 17, for "25 feet (7.6 m.)" read "30 feet."

Line 19, for "green" read "red."

Before paragraph "Anchorages" insert:

"A light, 15 feet above the sea, is shown from the molehead at Akhtari Basin. A fog signal is also made. (See Light List.)"

Line 17 from bottom, for "10 feet (3 m.) deep" read "11 feet deep (1938)."

Line 11 from bottom, for "nine" read "five" and for "black" "red and white."

Line 10 from bottom, for "upright cones" read "two cones, points together," and for "red" read "black and white."

Line 9 from bottom, for "red" read "black and white" and for "inverted cones" read "two cones, bases together."

Delete paragraph "Basin" and substitute:

"Moles.—The northern mole extends about 1,804 feet from the shore. Vessels berth alongside the center part of the mole, where there is a depth of 9 feet.

The southern mole, parallel to the northern mole, is 623 feet long and is used by fishing craft."

Page 329.—After line 5 insert:

"Radio.—There is a radio station here."

Line 12, for "white" read "red"; delete "each with a red hut at the base."

Line 13, for "on the north end of Yasenkaya Kosa" read " at the entrance to Beisugski Liman."

Line 14, after "range" insert ", 93°."

Line 15, delete "(Beacons destroyed, 1924.)" and substitute: "The least depth (1938) on the range line was 9 feet.

"Lights are shown from these beacons."

After line 21 insert:

"Light.—A light has been established about 0.9 mile 249° from Kamuishevat Church. (See Light List.)

"Two red spar buoys are moored near the 3-fathom curve 4½ miles west-southwestward of Kamishevatskaya Kosa.

"Two spar buoys, each surmounted by two cones with their bases together, are moored about 4¾ miles westward and 4¼ miles southward, respectively, of Kamuishevat Light."

Lines 16 and 15 from bottom, delete "A black conical" to "light" and substitute: "A light buoy, with whistle, showing a flashing white light."

After line 8 from bottom insert:

"A light buoy, painted white and black and showing a flashing green light, is moored near the western end of Elenina Shoal about 13.4 miles 238° from Dolgaya Kosa Light."

Lines 6–3 from bottom, delete "thence" to end of paragraph.

Page 330.—After line 2 insert:

"Light.—A light, visible 8 miles, is shown from a red beacon on Dolgaya Kosa almost 5 miles northwestward of Dolhansk Church."

Line 3, for "black" read "white."

Line 4, for "2¼" read "3½."

After line 9 insert:

"Obstruction.—A submerged obstruction, marked by spar buoys, lies about 3 miles northward of the western end of the spit.

"A Spar Buoy, painted white with a red band, marks a 21-foot patch northward of the obstruction and 9 miles east-northeast of Byelosarai Light (page 334)."

Before paragraph "Directions" insert:

"Caution.—Mariners are cautioned that moored mines exist in the approaches to and in the Taganrog Gulf in the area inclosed by lines adjoining the following positions:

"1. Berdiansk:

| | ° ′ ″ | ° ′ ″ |
|---|---|---|
| (*a*) | Lat. 46 49 42 N., | long. 37 05 00 E. |
| (*b*) | Lat. 46 45 30 N., | long. 36 58 30 E. |
| (*c*) | Lat. 46 44 18 N., | long. 37 02 30 E. |
| (*d*) | Lat. 46 48 00 N., | long. 37 12 00 E. |

"Note.—This area has been swept and is clear of mines to a depth of 24 feet.

"2. Dolgaya Kosa (Spit):

° ′ ″ ° ′ ″

(*a*) Lat. 46 54 00 N., long. 37 33 18 E.
(*b*) Lat. 46 47 00 N., long. 37 24 00 E.
(*c*) Lat. 46 45 00 N., long. 37 32 24 E.
(*d*) Lat. 46 44 00 N., long. 37 37 30 E.
(*e*) Lat. 46 43 00 N., long. 37 40 30 E.
(*f*) Lat. 46 07 00 N., long. 37 46 30 E.

"3. Novonikolaev:

° ′ ″ ° ′ ″

(*a*) Lat. 47 05 00 N., long. 37 51 00 E.
(*b*) Lat. 47 01 30 N., long. 37 45 30 E.
(*c*) Lat. 47 01 30 N., long. 38 03 00 E.
(*d*) Lat. 47 02 12 N., long. 38 03 42 E.

"NOTE.—This area has been swept and is clear of mines to a depth of 12 feet.

"4. Krivaya Spit:

° ′ ″ ° ′ ″

(*a*) Lat. 47 02 30 N., long. 38 07 24 E.
(*b*) Lat. 47 01 30 N., long. 38 07 30 E.
(*c*) Lat. 47 01 30 N., long. 38 17 30 E.
(*d*) Lat. 47 03 24 N., long. 38 17 30 E.

"NOTE.—This area has been swept and is clear of mines to a depth of 12 feet.

"5. Cockerill Shoal:

° ′ ″ ° ′ ″

(*a*) Lat. 46 56 24 N., long. 38 07 24 E.
(*b*) Lat. 46 50 24 N., long. 38 07 24 E.
(*c*) Lat. 46 50 00 N., long. 38 17 30 E.
(*d*) Lat. 46 56 48 N., long. 38 17 30 E.

"6. Yeisk:

° ′ ″ ° ′ ″

(*a*) Lat. 46 45 00 N., long. 38 08 30 E.
(*b*) Lat. 46 42 48 N., long. 38 08 30 E.
(*c*) Lat. 46 42 48 N., long. 38 13 00 E.
(*d*) Lat. 46 45 00 N., long. 38 13 00 E.

"NOTE.—This area has been swept and is clear of mines to a depth of 12 feet.

"7. Zolotaya (Golden) Bank:

° ′ ″ ° ′ ″

(*a*) Lat. 47 04 12 N., long. 38 31 30 E.
(*b*) Lat. 47 01 30 N., long. 38 31 30 E.
(*c*) Lat. 47 01 30 N., long. 38 33 00 E.
(*d*) Lat. 47 02 12 N., long. 38 35 12 E.
(*e*) Lat. 47 04 12 N., long. 38 35 12 E.

"NOTE.—This area has been swept and is clear of mines to a depth of 12 feet."

**Page 331.**—Line 10, for "8 feet (2.4 m.)" read "13 feet in 1937, but may be less during strong easterly winds."

After line 12 insert:

"SPOIL GROUNDS.—Two spoil grounds lie between Peschani Islets and the entrance channel to Yeisk. Each is marked by spar buoys."

Line 13, for "red" read "white."

Line 14, for "51 feet (15.5 m.)" read "48 feet."

Delete line 15 and substitute "framework tower, 45 feet in."

Line 17, for "white" read "red."

Lines 18 and 19, delete "with triangular top mark."

Lines 21 and 20 from bottom, for "red, 45 feet (13.7 m.)" read "green, 76 and 66 feet."

Line 16 from bottom, for "128°" read "131°."

Line 18 from bottom, for "64 feet (19.5 m.)" read "97 and 94 feet."

Line 17 from bottom, for "57 feet (17.4 m.)" and "408" read "93 feet" and "1,027."

Line 16 from bottom, for "128°" read "131°."

After line 15 from bottom insert:

"Buoys.—The outer end of the dredged channel to the port of Yeisk is marked by the two buoys, a red buoy on the starboard side and a black buoy on the port side entering, located about 8 miles from the breakwater heads."

Line 14 from bottom, for "An occulting" read "A fixed."

Line 11 from bottom, for "flashing" read "fixed."

Line 4 from bottom, for "red" read "black."

Line 3 from bottom, delete "group."

Page 332.—Line 1, for "black" read "white and red" and for "an occulting" read "a flashing."

After line 7 insert:

"A white spar buoy with a red band, about 10 miles northwestward of Yeisk town, marks the anchorage for foreign merchant vessels."

Line 9, after "basin" insert: "and by a siren at the outer extremity of the north mole."

Line 15, for "13 feet (4 m.)" read "10 feet."

Line 17, for "12 feet (3.7 m.)" read "14 feet alongside the quays."

Before paragraph "Yeisk" insert:

"Storm Signals are shown. See page 33."

Page 333.—Line 5, delete "its" through "church are,"

Lines 15 and 16, delete "beyond" to end of paragraph.

Lines 20 and 21, delete "painted" through "mark" and substitute "surmounted by two cones, bases together."

Delete lines 23 to 29 and substitute:

"Light Buoy.—A black light buoy, showing a flashing white light, is moored 4¼ miles northward of Cockerill Shoal. A spar buoy with a cone top mark is close eastward of the light buoy."

Line 17 from bottom, for "vessel" read "buoy."

Lines 6–5 from bottom, delete "This bank" through "northward" and substitute "a spar buoy marks its northwestern end."

Line 2 from bottom, for "an occulting" read "a flashing."

Page 334.—Lines 5 and 7, for "Vessel" read "Buoy."

Lines 12 and 11 from bottom, delete the paragraph.

Line 10 from bottom, for "A" read "Two," for "buoy" read "buoys" and for "an inverted cone" read "inverted cones."

Line 8 from bottom, for "marks" read "mark."

Line 7 from bottom, for "A similar buoy" read "Two spar buoys, surmounted by two cones, points together."

Line 6 from bottom for "marks" read "mark."

Line 4 from bottom, for "occulting" read "group flashing."

Line 2 from bottom, for "72 feet (21.9 m.)" read "63 feet."

Page 335.—Line 1, for "whistle" read "siren. If the siren is disabled a bell will be sounded."

After paragraph "The Coast" insert:

"A Wreck lies sunk 8 miles 193° from Byelosarai Light.

"An Obstruction is located about 8 miles 88° from Byelosarai Light."

Line 11, for "a dredged channel" read "two dredged channels the eastern one is."

Line 12, for "24 feet (7.3 m.) in 1924" read "9 feet in 1938."

To line 15 add: "The western or new channel about 7⅔ miles in length in a 12° direction to the southern entrance to the harbor; it was dredged to a depth of 21 feet (1938) and is marked by buoys and light buoys. Both these eastern and western channels are connected to Port-Azovstali, which is close eastward of the River Kalmius entrance, by a channel dredged in a 44° direction to a depth of 12 feet (1938)."

Line 18, for "395" read "480."

Lines 21–20 from bottom, for "about 10 feet (3 m.)" read "11 feet (1938)."

Line 20 from bottom, after "leading" insert "directly."

Line 18 from bottom, after "harbors" insert "in the southern part of Mariupol."

Lines 15–14 from bottom, for "22 to 25 feet (6.7 m. to 7.6 m.)" read "16 to 26 feet."

Before paragraph "Depth Signals" insert:

"Harbor Works.—A new harbor is being constructed southward of the coal harbor; an opening has been cut through the mole of the coal harbor allowing passage from the above-mentioned western or new channel. A mole or breakwater extends about ½ mile southward from the eastern side of the cut."

Delete lines 11 to 1 from bottom and substitute:

"Depth Signals.—See page 45."

Page 336.—Delete lines 1 from top to 5 from bottom, inclusive, and substitute:

"Lights—Range Lights.—See Light List for Range Lights leading through each of the dredged channels to the River Kalmius and the Southern Port of Mariupol and for other lights in this vincity.

"Fog Signal.—A fog bell is sounded from the head of Vostochni Mole.

"A fog bell is also sounded from the head of the pier on the eastern side of Kalmius River.

"Light and Bell Buoy.—A red and white light and bell buoy, showing a flashing white light, is moored about 7¾ miles southward of the inner entrance to the western or new channel.

"A light buoy, painted white and red and showing a flashing red light, is moored about 2½ miles south-southeastward of the light on the head of the River Kalmius Breakwater."

Page 337.—After line 1 insert:

"The connecting channel dredged in a 44° direction is marked on the northern side by two light buoys, each showing a flashing red light, and by red buoys. The southern side of this channel is marked by two light buoys, each showing a flashing white light, and by black buoys."

After line 10 insert:

SPOIL GROUND.—A spoil ground, marked by spar buoys, lies southeast of the breakwater on the eastern side of the entrance to Kalmius River.

"About 7 miles southwestward of the entrance to the Kalmius River, is another spoil ground, marked by a light float having a red conical superstructure and showing a flashing red light."

Line 23 from bottom, for "about 10 feet (3 m.)" read "(1939) a depth of 14 feet."

Lines 6 to 4 from bottom, delete "The massive" through "distance."

Bottom line, delete, "in the new."

Page 338.—Line 1, delete "port" and for "14 feet (4.3 m.)" read "20 to 21½ feet."

Line 26 from bottom, for "Novo Nikolaevskaya" read "Budenovka."

Lines 26–25 from bottom, delete "which may" through "church."

Delete paragraph "BEACON" and substitute:

"LIGHT.—A light has been established on a red iron framework beacon, on a concrete hut, with a circular daymark, the whole 59 feet in height, near the extremity of Krivaya Kosa. (See Light List.)"

Line 17 from bottom, after "spar" insert "surmounted by an inverted cone."

Line 16 from bottom, delete "with inverted cone top marks."

Line 13 from bottom, for "Beacon" read "Light."

To paragraph "BUOYS" add:

"A spar buoy, with a cross top mark, is moored about 2¾ miles south-southeastward of Krivaya Kosa Light. This buoy marks an obstruction."

Line 8 from bottom, for "VESSEL" read "BUOY."

Line 7 from bottom, for "Beacon" read "Light."

Page 339.—Delete paragraphs "BYEGLITSKI LIGHT VESSEL" and "FOG SIGNAL" and substitute:

"LIGHTED WHISTLE BUOY.—A lighted whistle buoy, painted red and showing a flashing red light, is located about 6 miles southward of Byeglitski Spit."

After line 26 insert:

"A DANGEROUS AREA, in which there are a number of wrecks, lies with its center about 5 miles southeastward of Byeglitski Light Buoy. The area has a diameter of 5 miles."

After line 9 from bottom insert:

"A spar buoy with an inverted cone top mark marks the southern edge of Petrushina Flat."

Page 340.—Lines 6 and 7, delete "The western" to end of paragraph and substitute:

"The western limit of the outer road is marked by two spar buoys, the southern, which is moored about 15¼ miles southwestward of Krivaya Spit Beacon, is painted white with a red stripe and has a black cone top mark. The northern buoy is about 3 miles northward of the southern and is painted white with a red stripe and has a red inverted cone top mark.

"The inner road is marked by a white spar buoy with a red band and surmounted by a white cone, situated 7 miles southward of Beglitskaya Spit."

Delete lines 8 to 31.

Page 341.—Line 5, after "tower" insert "with red band" and for "73 feet (22.3 m.)" read "65 feet."

After paragraph "A Fog Signal" insert:

"Light Buoy.—A light buoy, painted red and showing a flashing white light, is moored about 4¼ miles southward of Taganrog Lighthouse."

"Sewer Outfall.—A sewer outfall is marked by a spar buoy which is moored about 1½ miles east-northeastward of Taganrog Lighthouse."

Lines 11 and 10 from bottom, for "varies from 4 to 12 feet (1.2 to 3.7 m.)" read "was (1927) as follows: New Basin, 11 feet; Petrovski Basin, 10½ feet; Remontni Basin, 8 feet."

Page 342.—Line 1, for "3¾" read "4¾" and for "280" read "180."

Line 2, for "(1925) of 10½ feet (3.2 m.)" read "(1938) of 13 feet."

Lines 3–5, delete "It is" to end of paragraph.

Lines 9–10, delete "colored" to end of paragraph.

Line 12, for "a flagstaff on the south mole" read "the signal mast of the port."

Delete lines 13 to 32, inclusive, and substitute:

"The depth in the dredge channel is shown, in metric measure, by numeral pennants of the International Code hoisted on the mast at the head of the northern mole of Novi Basin."

Lines 13 and 12 from bottom, delete "two" through "post" and substitute "fixed green, 24 feet above high water, from a black pole."

Lines 10 and 9, delete "two" through "post" and substitute "fixed red, 79 feet above high water, from a gray pole."

Line 8 from bottom, for "116 yards 355°" read "230 yards 353°."

Line 7 from bottom, for "355°" read "353°."

Lines 2 and 1 from bottom, delete "and from the" to end of sentence.

Page 344.—Delete lines 7 to 15.

Delete lines 18 to 9 from bottom and substitute:

"Entrances.—The Morskoi Channel dredged to a depth of 13 feet (1937) is the channel used by vessels proceeding to Rostov. The channel has been dredged from a position in latitude 47°02′30″ N., longitude 38°58′36″ E., to the Peschonoe Mouth, a distance of about 11½ miles.

"The Podkhodnoi Channel connects with the Morskoi Channel 5 miles from the Peschonoe Mouth."

Delete lines 4 to 1 from bottom.

Page 345.—Delete from top of page to line 8 from bottom and substitute:

"Light Vessel.—A light vessel is moored at the entrance to Morskoi Channel. It is equipped with a radio. (See Light List.)

"Fog Signal.—A fog bell is sounded at the light vessel.

"Pilots are stationed on the vessel.

"Buoys and Beacons, both lighted and unlighted, mark the dredged channels."

Line 7 from bottom delete "The following."

Lines 4 and 5 from bottom, delete "Pereboini" to end of paragraph and substitute "pilot station."

Delete lines 3 to 1 from bottom, inclusive.

Page 346—Delete lines 1 to 19, inclusive, and substitute: "Traffic and depth signals are made."

Delete paragraph, "PILOT STATION" and substitute:

"PILOTS may be obtained at the light vessel but the pilot station should first be advised by radio. Pilotage is not compulsory. During the ice season vessels should telegraph to Rostov.

"The pilot station is situated on the left bank of the river 3 miles within the Peschanoe entrance.

"STORM SIGNALS are shown at the pilot station."

Delete paragraph "DEPTHS."

Before paragraph "Azov" insert:

"STORM SIGNALS are shown. See page 33."

Page 347.—Line 1 from bottom, for "light buoy" read "white whistle buoy with a spar buoy, surmounted by two cones, bases together, close to the whistle buoy."

Page 348.—Line 1, for "7" read "6½."

Lines 13 and 14, for "vessel" read "buoy."

Line 15, delete "close."

Lines 16 and 17, delete "guard" through "340" and substitute "white light buoy about 5¼ miles southeast of Krivaya Spit."

Lines 19 and 20, delete "Byeglitski Light Vessel northward of the black" and substitute "the light buoy, with a flashing red light moored, with a white spar buoy surmounted by an inverted cone close eastward, about 5½ miles southward of Beglitskaya Spit, northward of the white light buoy."

Line 21, for "southward and eastward" read "westward."

Line 20 from bottom, for "Egurcha" read "Peschonoe."

Page 349.—After paragraph "VESUVIUS ROCKS" insert: "These rocks are marked by a red conical buoy, surmounted by a cone, point down, and three red spar buoys, each surmounted by an upturned broom."

Delete lines 15 to 13 from bottom.

Line 12 from bottom, before "flashing" insert "fixed and."

Line 10 from bottom, for "79 feet (24.1 m.)" read "72 feet."

Delete lines 6 and 5 from bottom, respectively, and substitute:

"A LIGHT BUOY, painted red and showing a flashing red light, and a red spar buoy with an inverted cone top mark."

Line 4 from bottom, after "southern and" insert "a spar buoy, surmounted by two brooms, bases together, the" and delete "respectively."

After line 3 from bottom insert:

"A light buoy, painted red and showing a flashing red light, is moored 1.8 miles 172°30′ from Lower Berdyansk Light."

Line 2 from bottom, after "sunken wreck" insert "dangerous to navigation" and for "1½ miles 279°" read "4.35 miles 101°."

Page 350.—After paragraph "Berdyanski Road" insert:

"Prohibited Anchorage Area."—A prohibited anchorage area, the limits of which are shown on the chart, is located west-southwestward of Upper Berdyansk Light."

Line 17 for "two vertical fixed white lights" read "a light."

Line 19, for "46 feet (14 m.)" read "32 feet."

Line 21, for "11 feet (3.4 m.)" read "14 feet."

Line 22, for "2.7 miles 35°" read "2 miles 215°."

Line 21 from bottom, for "(1925)" read "(1938)" and for "15" read "21."

Line 20 from bottom, delete "(4.6 m.)."

Line 19 from bottom, for "red 38 feet (11.6 m.)" read "green, 63 feet."

Lines 18 and 17 from bottom, for "black triangular beacon with triangular top mark, 39 feet (11.9)," read "white rectangular framework structure, 56 feet."

To line 16 from bottom add: "The greater part of this beacon is difficult to distinguish.

Line 15 from bottom, for "white, 158 feet (48.2 m.)" read "green, 185 feet."

Line 14 from bottom, delete "red" through "(119. m.)" and substitute "white rectangular shape over a diamond shape, 55 feet."

To line 13 from bottom add: "A second light is shown from this beacon at an elevation of 207 feet."

Line 11 from bottom, for "fixed" read "occulting."

Lines 10–9 from bottom, delete "hut" through "height" and substitute "iron pyramid."

Line 8 from bottom, for "fixed" read "flashing."

Line 7 from bottom, delete "hut 12 feet (3.7 m.) in height" and substitute "iron pyramid."

Line 2 from bottom, for "southeastern" read "inner."

Line 1 from bottom, for "breakwater" read "mole."

Page 351.—To line 4 add "and two light buoys, the outer painted white and red and the inner painted red, showing flashing white lights. A red buoy moored at the entrance to the channel marks the place where the pilot meets vessels. A mooring buoy is 600 yards northward of the northwestern end of the breakwater and another is moored about 400 yards eastward of the head of Uzki Mole."

Lines 17 and 18, for "from 17 to 18 feet (5.2 to 5.5 m.)" read "14 feet."

After paragraph "Regulations" insert:

"A Telegraph Cable is landed close westward of the Upper Berdyansk Light."

To line 8 from bottom add: "there is a radio station."

Page 352.—Delete paragraphs "Pier" and "Light" and substitute:

"Pier.—Nogaisk pier, with a depth of 12 feet alongside its outer end, is situated opposite the village of Obitochnoe."

Line 24, for "triangle with base upward" read "square."

After line 19 from bottom insert:

"Light.—A light is exhibited from a red iron framework structure on a masonry base, 59 feet in height, close northwestward of Obitochna Spit Beacon. (See Light List.)"

Delete lines 15 and 14 from bottom and substitute:

"Light Buoy.—A red light buoy, showing a flashing white light, is moored in a depth of about 4 fathoms at 1½."

Line 13 from bottom, for "7½" and read "8."

Line 10 from bottom, for "conical" read "light."

To bottom of page add: "Two lights (vertical) are shown from the outer end of a pier at Botevo, about 6 miles east-northeastward of Nova Konstantinovka. These lights are shown only when vessels are working cargo."

Page 353.—After line 10 insert:

"LIGHTS.—A light is shown from a black iron framework structure situated at Kirilovka.

"A light is shown from a black skeleton structure on the coast at Nova Konstantinovka. (See Light List.)"

Line 18 from bottom, for "90 feet (27.4 m.)" read "81 feet."

Lines 9 to 5 from bottom, delete "A 21-foot" to end of paragraph and substitute: "An 18-foot 5.5 m.) shoal lies about 9 miles eastward of Biryuchi southern beacon. Westward and northwestward of it are several shoals of 21 and 22 feet.

"A red spar buoy, surmounted by two cones, bases together, marks the western extremity of the flat westward of Biryuchi Spit Light. (See Light List.)"

Page 354.—Delete lines 14 and 16 and substitute:

"A black-and-white buoy and a black buoy, each with a cone top mark, are moored 3 and 6 miles, respectively, south-southeastward of the above black buoy."

After line 13 from bottom, add:

"In 1940 there was a depth of 13 feet in the channel leading to the harbor. Spar buoys, from which fixed white lights are shown, mark this channel."

Line 8 from bottom, for "BUOY.—A red conical buoy" read "LIGHT BUOY.—A red conical light buoy showing a flashing white light."

Line 4 from bottom, for "Two vertical fixed red lights" read "A light."

Line 3 from bottom, for "are" read "is."

Line 2 from bottom, for "51 feet (15.5 m.)" read "40 feet."

Page 355.—To line 24 add: "The depth over the bar was (1937) 14 feet."

Lines 21 to 19 from bottom, delete "green" through "(9.4 m.)" and substitute "red, is shown from a shield painted black with white vertical stripe, and surmounted by a cone, point up, the whole 29 feet."

Lines 17 to 15 from bottom, delete "58" through "(18.3 m.)" and substitute "is shown from a shield painted black with white vertical stripe, the whole 44 feet."

Line 9 from bottom, for "black spar buoys" read "spar buoys surmounted by inverted cones" and for "red spar buoys" read "spar buoys surmounted by cones."

Line 8 from bottom, delete "and by" through "entrance."

Line 7 from bottom, delete "The red" through "mentioned" and substitute: "A light buoy, painted red and white and showing a flashing white light."

To line 6 from bottom add: "A spar buoy, surmounted by two cones, points together, is moored near this light buoy."

Line 8 from bottom delete ", and by a red spar buoy at the entrance."

Line 7 from bottom, for "buoy" read "light buoy."

Page 356.—Line 3, for "Genischesk" read "entrance range beacons on Arabatski Point."

To paragraph "BEACON" add:

"A spar buoy, surmounted by two cones points together, is moored east of the flat."

To line 3 from bottom add: "There is a radio station at Arabat."

After line 3 from bottom insert:

"LIGHTS.—A light is exhibited from a wooden framework structure 33 feet high, with a hut at its base, situated 2.2 miles 319° from the fortress of Arabat.

"A light is exhibited from the extremity of the pier situated in the vicinity of the above light. (See Light List.)"

Page 357.—To line 16 add "The patch is marked by a 'cross' spar buoy."

After line 22 insert:

"LIGHT.—A light has been established on the eastern hill on Kazantip Point. The light is exhibited from a red lantern on an iron support, rising above the upper platform of the main tower, which is a gray cylindrical masonry structure. The height of the structure is 37 feet. (See Light List.)"

Page 358.—Line 12, after "shore" insert: "A telegraph cable is laid in this bay."

After line 18 insert:

"PROHIBITED ANCHORAGE.—A prohibited anchorage area is located in the bay. For details see the chart."

Page 360.—After line 8 insert: "A light buoy, showing a flashing white light, and painted black and white, is moored on the southwestern side of Marii Magdalini Rock."

Delete paragraph "DIRECTION."

Page 361.—Delete lines 9 to 11.

Line 14, for "fixed red" read "flashing green."

Lines 15–17, delete from "pyramidal" to "(14.3 m.) in height" and substitute: "framework mast, 38 feet high, surmounted by a white top mark with a black vertical stripe."

Line 18, for "fixed white, 68 feet (20.7 m.)" read "occulting red, 65 feet."

Line 20, for "120°" read "118°."

Delete lines 22 and 23, and add:

"A second range, leading from the above range to the mole, is exhibited. (See Light List.)"

Line 7 from bottom delete "a flagstaff near the guardhouse" and substitute "the yardarm of a mast on the inner part of the pier."

Page 362.—To line 28 add: "There is a radio station."

Line 5 from bottom, for "18 feet (5.5 m.)" read "13 feet."

Before paragraph "ANCHORAGE" insert:

"ROCK.—A rock with a depth of less than 6 feet over it is reported to exist 2 miles 270° from Utrish Light.

"BUOY.—A spar buoy with two brooms, bases together, is located 3.9 miles 147° from Utrish Point Light, and a light buoy, painted black and white and showing a flashing white light, is moored to the northwestward of it.

"These buoys mark a wreck over which is a depth of 12 feet."

Page 365.—Line 9, for "3½ fathoms" read "13 feet."

After line 12 insert:

"A dangerous wreck lies 2.31 miles 234° from Penai Point Light."

Line 22 from bottom, for "BELL" read "WHISTLE."

Line 21 from bottom, for "bell" read "whistle"; after "red" add "and white."

Line 20 from bottom, for "occulting" read "flashing" and to the line add "and by a spar buoy painted red and white with a top mark consisting of two cones, bases apart. The light of the light and whistle buoy off Sudzhuk Point was reported not burning. (March 1928).

"Two moorings buoys, marking an obstruction, are moored 100 yards northward and northwestward of the light and whistle buoy.

"A spar is moored ½ mile 261° from the light and whistle buoy."

Lines 16–15 from bottom, for "85 feet (25.9 m.)" read "72 feet."

Line 11 from bottom, for "36 feet (11 m.)" read "26 feet."

After line 10 from bottom insert:

"A LIGHT is shown from a white square pyramidal tower with black bands situated on Sudzhuk Point (Sudzhukskaya Kosa). (See Light List.)"

Line 9 from bottom, for "red" read "white" and for "white" read "blue."

Line 7 from bottom, for "42 feet (12.8 m.)" read "35 feet."

Line 5 from bottom, for "white iron post" read "red framework structure and hut."

Delete lines 3 and 2 from bottom and substitute:

"Within the harbor a number of lights and range lights mark the piers and approaches."

To bottom of page add:

"A LIGHT BUOY, painted in red and white checkers and showing a flashing green light, is moored 1.4 miles 152° from the light on the east molehead.

"A light is shown from the head of the spur of the Coasting Mole, and lights are shown from each of the two outer corners of Pier No. 4.

**"A light buoy, painted in red and white and showing a flashing green light, is moored 3 miles 306° from Penai Point Light."**

Page 366.—After line 14 insert:

"An anchorage for foreign vessels is limited to the southwest and south by a line extending from the head of the east mole to a red and white checkered buoy showing a flashing green light and moored 1.45 miles 152° from that head, and thence extending in a 90° direction to the shore. There are wrecks in the southeastern part of this anchorage."

Delete paragraphs "REGULATIONS."

Page 367.—Delete line 22 and insert:

"STORM SIGNALS are shown from the root of the Western Mole and also from the Coasting Mole. See page 33."

Lines 24 and 23 from bottom, for a "depth of 20 feet (6.1 m.) at its outer end" read "a depth of 28 feet on its northern side and of 25 to 26 feet on its southern side, where vessels come alongside to load petroleum."

Line 11 from bottom, for "30 feet" read "26 feet in both sides and."

Lines 9 to 4 from bottom, delete "A basin" through "(11 m.)" and substitute: "A broad mole, with warehouse, two sets of double tracks and three traveling cranes, is located westward of the jetty (1930). There is (1925) a depth of 28 to 29 feet on the eastern side and at the head of the mole."

Page 368.—Lines 5 and 6, delete "The water is not good."

Lines 7 and 8, delete from "Coal" through "stock" and substitute "Coal in sufficient quantities for bunkering purposes is ordinarily on hand."

To line 11 add: "about 15,000 tons are usually available and may be supplied at the rate of 160 tons per hour."

After paragraph "COMMUNICATION" insert:

"RADIO.—There is a radio station at Novorossisk."

Page 369.—Delete line 6.

Lines 14 and 15, for "19 feet (5.8 m.)" read "14 feet."

Line 17, after "red" insert "and green" and after "sea" insert "and visible 9 miles."

Lines 18-19, for "41 feet (12.5 m.)" read "20 feet."

Page 370.—After paragraph "CAPE IDOKOPAS" insert:

"LIGHT.—A light is shown from a white iron framework structure, 23 feet in height, on Cape Idokopas. (See Light List.)"

Page 371.—Line 17 from bottom, for "14 feet (4.3 m.)" read "11 feet."

To line 16 from bottom add: "A light is shown from the pier when vessels are expected."

Delete lines 2 and 1 from bottom of page.

Page 373.—Delete lines 11 to 14 and substitute:

"LIGHTS.—A light marks the outer extremity of the curved mole.

"A light marks the eastern extremity of the detached breakwater."

Line 16, for "26 feet" read "36 feet."

Line 17, delete "460 yards."

Line 19, for "13 feet" read "50 feet."

Line 20, for "58" read "130" and for "353°" read "3°."

Line 21, for "353°" read "7°."

Delete lines 20 to 16 from bottom and insert:

"SHOAL.—A shoal with a least depth of 22 feet lies about 300 yards westward of the southern entrance to the harbor."

Line 13 from bottom, delete "and westerly" and "for about 860 yards."

Line 8 from bottom, for "24 feet (7.3 m.)" read "26 feet (1936)."

After line 4 from bottom insert:

"In the entrance to the Government port there were in 1929 obstructions with a depth of 15 feet over them."

Delete lines 3 to 1 from bottom and substitute:

"NEW HARBOR.—The new harbor is between the eastern mole of the Government Harbor and a mole to the southeastward which extends first to the southward and then southwestward. A detached breakwater fronts the harbor and a smaller detached breakwater is seaward of the former. The Petroleum

Harbor can accommodate tankers up to 550 feet in length and with a draft up to 29 feet.

"The western entrance to Tuapse Harbor is closed to navigation.

"A light buoy, painted red and showing a flashing white light, is moored near the southwestern extremity of the breakwater under construction, and there is one other light buoy within the harbor."

Page 374.—Delete lines 1 to 13, inclusive.

Before paragraph "STORM SIGNALS" insert:

"DREDGING—SIGNALS.—Vessels approaching the dredger at work in the harbor must sound three long blasts on the whistle and slow down.

"The dredger will answer with one blast if the vessel is to pass to starboard or two blasts if the vessel is to pass to port of the dredger. The dredger will also show a red flag by day and two red lights, placed vertically, by night on the side on which the vessel is to pass.

"If for any reason it is impossible for a vessel to pass, the dredger will hoist by day two red balls with a white shape between them and by night two red lights with a white light between them."

Before paragraph "TUAPSE" insert:

"PILOTS.—Pilotage is compulsory. The pilot comes out in a decked motorboat and boards outside the breakwater."

After paragraph "TUAPSE" insert:

"Piers with 32 feet of water alongside are now available. Fuel oil, coal up to 300 tons, and fresh water can be taken at the piers."

Page 375.—Line 17, for "43 feet (13.1 m.)" read "33 feet."

To paragraph "SOCHI LIGHT" add:

"A Radiobeacon is operated at the light station. (See H. O. No. 205, Radio Navigational Aids.)"

Line 19, for "red" read "green."

Line 22, for "195 feet 90°" read ".04 mile 19°."

Before paragraph "CONSPICUOUS OBJECTS" insert:

"These range lights are shown on request.

"A LIGHT BUOY, painted black and white and showing a flashing red light, is moored southwestward of Sochi Light."

Before paragraph "SOCHI" insert:

"HARBOR WORKS are in progress (1939). Vessels must not anchor within ½ mile of the shore of the Road.

"STORM SIGNALS are shown by day."

To line 5 from bottom add: "There is a radio station."

Page 376.—After line 9 insert:

"Range Lights are shown at Khosta Roads. The rear light is shown from the roof of the Naval Railway station.

"The front light is shown from a yellow square structure with a red stripe and a lozenge-shaped topmark about 93 yards 233° from the rear light. (See Light List.)"

Lines 19–20, for "29 feet (8.8m.)" read "24 feet."

Delete lines 24 to 19 from bottom and substitute:

"ANCHORAGE BEACONS.—The northern range line consists of a beacon consisting of a white hut on a framework structure and showing a fixed green light in range with and 85 yards from Adler Point Lighthouse bearing 18°."

Lines 17 to 15 from bottom, delete "a white" to end of paragraph and substitute "white huts on framework structures, 16 and 23 feet high, respectively."

Delete lines 14 to 12 from bottom and substitute:

"The intersection of these ranges mark an anchorage to 6½ fathoms."

To bottom line add "There is a radio station at Adler.

"PILENKOVO is a village situated about 7½ miles southeastward of Adler.

"Two lights in range 23° lead to the anchorage. These lights are shown only when required by local vessels. (See Light List.)"

Page 377.—Lines 14 and 15, delete "The front" to end of paragraph.

Line 16, for "middle" read "front."

Line 17, after "beacon" insert "15 feet high."

Line 20, after "beacon" insert "21 feet high."

Lines 20 and 21, for "on a wall of the castle" read "slope of the hill behind the sanatorium."

Delete lines 23, 24, and 25 and substitute:

"RANGE LIGHTS.—The front light is shown from a mast with a white triangular day mark situated near Gagripsh River.

"The rear light is shown from mast with a white triangular daymark, 700 yards 108° from the front light."

Line 26, for "beacon" read "light."

Page 378.—To line 4 add "and radio station."

Lines 20–19 from bottom, for "111 feet (33.5 m.)" read "101 feet."

After line 18 from bottom insert:

"AN OBSTRUCTION has been reported to lie about 2.7 miles 67° from Pitsunda Road."

Page 379.—After paragraph "SOUKSU POINT" insert:

"LIGHT.—A light is exhibited from a white iron framework beacon, 40 feet high, on Souksu Point. (See Light List.)"

Page 380.—Line 4, for "fixed" read "group flashing."

Lines 5 and 6, delete from "white" through "height" and substitute: "red hut with a white stripe, on a framework structure 14 feet high, with a rectangular shield top mark."

Before paragraph "SUPPLIES" insert:

"PIER.—There is a small pier at Guduat, with a depth of 8¼ feet at its outer end. A shoal with a depth of 19 feet lies 1¼ miles west-southwestward of it."

Line 11 from bottom, for "124 feet (37.8 m.)" read "109 feet."

After paragraph "SUKHUMSKI POINT LIGHT" insert:

"A RADIOBEACON is operated from the light station. (See H. O. Pub. 205, Radio Navigational Aids.)"

Page 381.—Lines 12–13, for "91 feet (27.7 m.)" read "53 feet."

After line 18 insert:

"Two range lights are situated on the outer section of the Passenger Pier. These lights in range, bearing 358°, lead to the pier.

"When vessels are expected, a light is shown from each of the outer corners of the Passenger Pier. (See Light List.)"

Line 21, for "on a bell near the front light beacon" read "from the outer extremity of the Passenger Pier."

Before paragraph "SUKHUM" insert:

"STORM SIGNALS are shown at the inner end of the passenger pier."

Page 382.—After line 9 insert:

"LIGHT.—A flashing red light is exhibited from a white iron framework column, 40 feet high, on Kodor Point."

Delete lines 4 to 1 from bottom and substitute:

"A harbor, consisting of a basin with two wharves, has been constructed at Ochemchiri. The depth in the approach channel was 21 feet, in 1938, with a similar depth in the basin.

"RANGE LIGHTS, in range 359½° lead up the approach channel to the harbor.

"A LIGHT BUOY, painted red and showing a flashing red light is moored off the end of the western mole and on the edge of the approach channel."

Page 383.—Line 1, after "telegraph" insert "and radio."

After line 13 insert:

"LIGHT.—A light is exhibited from a red hut with white vertical stripes on a framework structure, 40 feet high, on Fort Anakria. (See Light List.)"

Line 2 from bottom, for "124 feet (37.8 m.)" read "111 feet."

At bottom of page insert:

"A RADIOBEACON is operated from the light station. (See H. O. Pub. 205, Radio Navigational Aids.)"

Page 384.—Line 1, for "fixed" read "occulting."

Line 2, for "lamp-post, 22 feet (6.7 m.) in height" read "yellow iron column, surmounted by a square, and a black disk."

Line 5, for "lamp-post, 29 feet (8.8 m.) in height" read "yellow iron column surmounted by a square."

Line 6, for "114°" read "116°."

Lines 10–15, inclusive, delete from "The front light" to "light" and substitute:

"The rear light is shown from a white rectangular shield with red stripe, which stands 0.23 mile 328° from Poti Light. The front light is shown from a white rectangular shield with red stripe which stands 0.15 mile 341° from the rear light (see Light List)."

Line 18, for "37" read "52".

Line 19, delete "(11.3 m.)" and for "9 and 5" read "7 and 4."

Line 20, for "lantern on trusses" read "iron skeleton tower."

Line 22, for "fixed white" read "flashing blue."

To bottom of page add:

"A protective mole extends 352 yards westward from the shore 700 yards northward of the northern mole."

Page 385.—To line 16 add "in 1927 Poti Harbor was available for vessels with a draft of 27 feet. In 1940 a vessel drawing 28 feet aft had to push through soft mud when entering the harbor."

Lines 25 and 26, for "southwest angle of the south" read "head of the north.

"TRAFFIC SIGNALS are also shown here. The absence of any signal denotes that the port is open to shipping."

Line 15 from bottom, for "Only anthracite coal is available" read "There is an ample supply of steam coal."

After paragraph "COMMUNICATION" insert:

"RADIO.—There is a radio station at Poti."

Page 386.—Delete paragraph "BUOY" and substitute:

"BUOY.—A spar buoy is moored outside the 5-fathom curve westward of Poti Lighthouse."

Page 387.—Delete lines 3 to 6 and substitute:

"The smelting works, eastward of the town, is an excellent landmark, especially at night, as the flares may be seen for 20 miles seaward."

To line 16 add: "Less water was reported (1931) on this bank."

Delete line 17 and substitute: "An obstruction lies about."

After line 18 insert: "a 1-fathom shoal lies 1,120 yards 41° from the light on the western end of the Petroleum Mole."

Delete lines 19 to 21.

Delete paragraph "CAUTION."

Line 17 from bottom, for "fixed" read "flashing."

After paragraph "BATUM LIGHT" insert:

"A light is shown from a white quadrangular truncated pyramid, 18 feet high, situated on the rising ground at the head of the bay at about ¾ mile 175°45' from the light on the petroleum mole.

"These lights in range lead to the harbor entrance. (See Light List.)

"A RADIOBEACON is operated at the Batum Light station. (See H. O. Pub. 205, Radio Navigational Aids.)"

Lines 9–4 from bottom, delete the paragraph and substitute:

"Three lights vertically disposed are shown from a framework structure at the inner end of Burun Tabiya Mole."

To line 3 from bottom add: "and by a bell at the Russian Steamship & Trading Co. Pier."

Delete lines 2 and 1 from bottom:

Page 388.—To line 3 add: "A light buoy, painted black and white and showing a flashing white light, is located to the northward of these spar buoys."

Line 21 from bottom, for "550" read "700."

Line 18 from bottom, for "27 feet (8.2 m.)" read "30 feet, and there is from 23 to 32 feet alongside the quays."

Page 390.—Line 17, delete "not" and for "but" read "and."

After line 18 insert:

"STORM SIGNALS are shown from a mast standing on the western shore of the harbor westward of the petroleum mole. This mast is also used for signalling to vessels."

Lines 19 and 18 from bottom, for "is a fine cathedral in the town, conspicuous from seaward; also" read "are."

Lines 4 and 3 from bottom, delete ", with depths" to "inner side."

Page 391.—Lines 1 to 3, delete "About 7,000 tons" to "26 feet (7.9 m.)" and substitute:

"No coal is available, but unlimited supplies of fuel oil can be obtained alongside the pier."

Line 6, for "plentiful and cheap" read "are not available."

Delete line 7 and substitute: "can be obtained from hydrants on the quay."

Line 9, for "40" read "50."

To bottom of page add:

"A light is shown from a white pyramidal framework structure, 34 feet high, at the entrance to Chorokh River. (See Light List.)"

Page 393.—After line 9 insert:

"HOPA LIGHT.—A light is shown from a white cylindrical tower, 44 feet in height, situated on Peremit Point. (See Light List.)"

Lines 9 and 8 from bottom, for "a white metal pillar" read "an iron framework tower on a white hut."

Page 394.—After paragraph "RIZE" insert:

"There is a landing pier for passengers. Cargo is handled by lighters."

Page 395.—Line 17 from bottom, for "90 feet (27.4 m.)" read "98 feet."

Line 14 from bottom, for "256°" read "76°."

**Page 396.—Line 24, after "craft" insert: An 8-ton hand crane and a 3-ton electric crane are situated near the end of this arm.**

To paragraph "PORT" add:

"There are several jetties, with depths of 3 to 5 feet alongside."

Page 397.—Lines 7 to 10, delete from "Good water" through "wholesome" and substitute: "Water is delivered in tins and barrels."

To line 16 add: "The port is open for international trade. Some lighters and tugs are available."

To paragraph "PLATANA" add:

"There is a landing pier here and to the westward of it is a large pink modernistic building; several lighters are available."

Page 398.—To line 13 from bottom add: "Gorele is a village about 7 miles westward of Kureli Point. There is reported to be good anchorage in the open roadstead ½ mile from the shore.

"There is a small landing pier for boats."

Lines 12 and 11 from bottom, for "79 feet (24.1 m.)" read "88 feet."

**To bottom of page add:**

**"Tereboli has a stone sea wall 160 feet long, against which light craft discharge their cargoes. A steep road leads from the water front to the main part of the town.**

**"There are a few lighters of 10- to 15-tons capacity."**

Page 399.—To line 8 from bottom add: "Several of the prominent buildings were destroyed by an earthquake in 1938.

"There are numerous new buildings on the southern part of the town most of which are white with red-tiled roofs. The hospital is a prominent building on the hillside to the southward."

Page 400.—Line 10, for "white" read "red."

Line 11, for "194 feet (59.1 m.)" read "131 feet."

**Delete paragraph "KIRESUN" and substitute:**

**"KERASUNDA (Giresun) (40°56′ N., 38°24′ E.) has a population of about 26,000. It is the center of the hazel nut business. The port is open for international trade.**

**"WHARVES.—There is an irregular shaped landing stage built of reinforced concrete on a natural rock foundation. Lighters can use two sides of the landing stage, 25 yards with a depth of 15 feet alongside, and 40 yards with a depth of 10 feet alongside. The latter side has two fixed hand-cranes of ½- and 5-tons capacity. There are about 35 lighters (15-tons capacity each) available. There are no tugs available.**

**"SUPPLIES.—Fresh provisions are plentiful. Ordinary water is abundant, but drinking water has to be brought in from outlying springs.**

**"HOSPITAL.—A hospital with 50 beds is located here."**

**Page 401.—Line 15, for "7,000" read "10,000."**

**After line 19, add:**

**"A jetty, constructed of reinforced concrete and steel joints with a wooden plank covering, is located about ¼ mile to the eastward of a prominent white minaret. It is 250 feet long and 14 feet wide and has a depth of 6 to 8 feet at the end.**

**"There is a ½-ton hand crane available. There are several lighters of from 15- to 20-tons capacity."**

Lines 14 and 13 from bottom, for "fixed white 118 feet (36 m.)" read "flashing white 127 feet."

**Page 402.—After line 10 from bottom insert: "A reinforced concrete jetty, about 100 feet by 10 feet, is located ½ mile westward of the timber jetty. There are a few lighters of 15- to 20-tons capacity."**

**Page 403.—Line 20, after "beach" insert: "There are 3 or 4 hand propelled lighters of 15- to 20-ton capacity."**

Page 405.—Before paragraph "SAMSUN" insert:

"LIFESAVING.—There is a lifeboat, a line-throwing apparatus, and a refuge station at Samsun."

**To line 5 add: "It had a population in 1940 of 36,000."**

**To line 8 add: "All the piers are for the use of small boats and medium sized lighters. There are at the port, two small tugs, several towing launches, and about 100 lighters of capacities up to 20 tons."**

**Lines 10 and 11, delete "There are" to end of sentence.**

To line 14 add: "The port is open for international trade."

**After line 16 insert: "A railroad connects Samsun with Sivas on the main line Istanbul-Ankara-Erzurum."**

**"HOPA (41°25′ N., 41°24′ E., B. A. Chart 2236), in the vicinity of the charted coastal villages of Khoppa and Kize, has two landing piers. One of the piers is for the use of small lighters and has a depth of 13 feet at its end. The other pier, at the northern end of the village, has a 5-ton traveling crane and is used by small coasting steamers, principally in connection with the copper mines. Anchorage can be taken in the open roadstead ¼ mile from the shore. In calm weather lighters can be loaded and discharged on the beach."**

**Page 407.—To line 11 add: "The most distinguishable landmark from any bearing of the isthmus is a tall chimney at the southern end of the town."**

After line 23 insert:

"A FOG SIGNAL is made on a siren close to Sinope Lighthouse situated on Boztepe Point. (See Light List.)"

Page 408.—Line 18 from bottom, for "fixed and" read "group" and for "92 feet (28 m.)" read "85 feet."

Page 409.—Line 22, for "white" read "red."

Line 23, for "85 feet (25.9 m.)" read "125 feet."

**Line 11 from bottom, add: "There is a concrete pier with depths of less than 6 feet at its head. A breakwater protects the pier. Numerous small lighters are available."**

To line 8 from bottom add: "The port is open for international trade."

Page 410.—Line 19 from bottom, delete "alternating."

Line 18 from bottom, delete "and red" and for "262 feet (79 m.)" read "269 feet."

After line 13 from bottom insert:

"A FOG SIGNAL is made on a siren close to Kerempe Lighthouse. (See Light List.)"

Page 412.—Lines 12 and 13, for "312 feet (95.1 m.)" read "252 feet."

Lines 23 and 22 from bottom, delete "the extremity" through "buoy."

Page 413.—Line 3, for "2" read "about 8."

**Line 22 from bottom, after "rocks" insert "at about 500 yards off shore for large vessels."**

**To line 22 add "but affords little or no protection against northwesterly winds."**

Line 13 from bottom, for "5 to 7 fathoms (9.1 to 12.8 m.)" read "3¼ to 4¾ fathoms, and about 4 fathoms alongside the quays."

Delete lines 8 to 1 from bottom.

Page 414.—Delete paragraph "Buoys" and substitute:

"Buoys.—Mooring buoys are moored in the northeastern part of the harbor."

Lines 6 and 7, delete "a rectangular" through "mast" and substitute: "flag F. of the International Code of Signals."

Before paragraph "Tugs" insert:

"Lifesaving.—There is a line-throwing apparatus and a refuge station at Zunguldak."

**To line 13 add: "It had a population of about 37,701 (1940) and is one of two ports on the Turkish Black Sea coast served by a railroad. The railroad connects with the main line railroad at Irmak."**

Lines 19 to 21, delete "Vessels" through "crane."

After line 21 insert:

"There is a 60-ton floating sheer-legs."

**After line 23, insert: "A crane of 2½-tons capacity is located near the head of the landing jetty at the south side of the artificial harbor. This jetty is available for passengers and light freight."**

To line 29 add: "The port is open for international trade."

**Line 30, after "telegraph office" insert "telephone communications."**

Page 415.—After line 18 insert:

"Fog Signal.—A fog signal is made on the bell at this light."

Delete lines 23 and 22 from bottom and insert:

"Lifesaving.—A rocket apparatus is stationed at Eregli."

Lines 5–1 from bottom, delete and substitute: "The preferred anchorage in Bender Eregli Bay, which was formerly the area between Cape Baba and the ancient mole, is now dangerous on account of numerous wrecks and should be avoided. Two green buoys have been moored near the outer limit of the area, in positions 600 yards 130° and 970 yards 123° from Cape Baba Lighthouse."

Page 416.—Delete lines 1–4, inclusive.

Page 417.—Line 21, after "Light—A" insert "group."

Page 419.—Line 18, for "rocket station" read "line-throwing apparatus."

To line 19 add: "A refuge station is also located at Kilia."

Delete lines 2 and 1 from bottom of page.

Page 422.—Insert in table:

"Braila, marine railway, lifting capacity 1,000 tons."

Page 423.—Galatz, under lifting power, for "2,200" read "1,200."

Page 424.—Constantsa, last column, for "24 to 30" read "26."

Muriupol, second column, for "24" read "See remarks." Under Remarks insert: "Vessels up to 23 feet draft can enter."

Sulina, second column, for "21" read "24"; last column, delete "channel dredged to 24 feet, but since silted."

Taganrog, second column, for "12 feet" read "10½ feet."

Varna, under Remarks, for "23 feet" read "25 feet."

Page 437.—Delete paragraphs 3, 4, 5, 6, and 7.

Page 438.—Line 3 from bottom, for "28" read "15."

Page 439.—Lines 16 to 18, delete "the northern" to end of paragraph.

Lines 13 to 11 from bottom, delete "this" to end of paragraph.

Page 441.—Line 4, for "three prolonged whistles" read "one long blast."

Page 444.—Lines 8 to 14, delete "hoist" through "health" and substitute: "display one of the quarantine signals given in the International Code of Signals."

Page 445.—In the list of customhouse agencies delete "2. Ochakov." "5. Skadovsk", "8. Sevastopol", "12. Anapa", "16. Sochi", "17. Gagri", and "18. Galaut", in the Black Sea, and "1. Genichesk" in the Sea of Azov, as these places are no longer ports of entry for foreign vessels.

Page 446.—Delete Appendix VIII.

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